The Scientific Review,

AND

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A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

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Pipes, Tubes and Syphons; Joining Pipes.—H. Sharp, 3968. W. J. Fernie, 4047. W. Foulis, 4077. G. Beck and P. S. Justice, 4114. J. C. Russell, 4153. G. K. Ashworth, 4342.

Pistons, &c.—W. H. Walker, 4024. W. Weyhe, 4052. G. Allibon and W. A. Taylor, 4122. W. F. Goodwin, 4199.

Plants, Trees, &c.—W. Spence (com.), 4041.

Plates, Dishes, &c.—F. Wirth (com.), 3993.

Ploughing, Digging, Clod Crushing, Land Rolling, Harrowing, Agricultural Implements, Tilling and Cultivating Land.—P. S. Justice, 3984. H. S. Coleman and A. G. E. Morton, 4004. W. Spence (com.), 4041. J. Huxtable, 4176. H. B. Greenwood, 4181. W. Sargeant, 4295.

Preserving and Hardening Wood, Metal, Stone, &c.—C. Copland, 4187.

Preserving and Preparing Articles of Food.—T. Morris, 3897. C. P. Poucier, 3995. C. Morfit, 4062. J. Glover, 4075. E. Foulger, 4211.

Presses; Compressing.—T. Grant, 3929. H. Martin, 3964. W. Jasper and S. Boushey, 4008. W. Smith, D. Marks, and W. A. Midgley, 4129. W. Needham and J. and J. Kite, 4141. W. R. Lake (com.), 4284.

Printing and Transferring; Type and other Surfaces for Printing, Composing, and Distributing Type.—H. A. Schuman and W. Zelbi, 3985. E. Capron, L. Duvivier, and W. Ponsolle, 4009. W. Taylor, 4001. W. Morgan-Brown (com.), 4111. W. P. Thompson (com.), 4239. A. J. Parker, 4329.

Propelling Carriages.—H. P. Holt, 4178.

Propelling Machinery, Transmitting Power and Motion, Converting Movements.—G. Williamson, 3914. T. Wrigley, 3916. J. Drysdale, R. W. Baynes, C. W. Vosper, and W. J. Tuawdon, 3921. E. G. Brewer (com.), 4002. T. P. Bache, 4045. O. Ball and P. Dracup, 4095. G. Sonnenthall (com.), 4096. W. F. Goodwin, 4199. S. Mills (com.), 4237.

Propelling Ships, Propellors, Paddle-wheels, and Screws.—F. and F. W. Ashe, 3983. R. Griffiths, 4279.

Pulleys.—J. Gee, 4296.

Pumps, Pumping and Raising Water and other Liquids, Pumps, Pistons, and Packing.—E. P. H. Vaughan (com.), 3942. J. E. Outridge, 4012. E. Hamer, J. Metcalfe, and E. Davies, 4014. E. T. Hughes (com.), 4028. W. R. Lake (com.), 4182. C. Ashbury (com.), 4282. E. Sanders, 4292. J. McInnes, 4304.

Punching and Perforating.—J. Yates, 3927.

Rags and Waste, Separating Rags from Fabrics.—W. A. Barlow (com.), 4227.

Railways, Permanent Way, Rail Joints, Chairs and Sleepers, Portable Railways, Atmospheric Railways. Switches, points, Crossings, and Turntables.—W. R. Lake (com.), 3917. J. Fisher and B. Elliott, 3924. J. J. Halcombe, 3950. F. Wirth (com.(, 4010. J. P. Smith, 4026. R. Baillie, 4072. H. O. Fisher, 4082. H. A. Haarmann, 4121. C. Wood, 4210. G. H. Fish, 4257. G. Capper, 4265.

Railways, Carriages, Coupling, Uncoupling, and Altering Position of Carriages and Engines.—J. F. Bernard, 3996. G. W. von Nawrocki (com.), 4018. J. J. Turner, 4080. E. G. Sheward, 4084. W. Wilkes, 4087. H. C. Briggs and G. Robson, 4108. J. Wood, 4212. J. Henderson, 4302.

Reaping, Mowing, Making Hay, Gathering in Produce.—E. P. H. Vaughan (com.), 4060. W. F. Goodwin, 4201. T. R. H. Fisken, 4242.

Refrigerating, Cooling Liquids, Making Ice.—J. Gainger, 4064. J. Gainger, 4065.

Registering, Indicating, and marking.—A. G. Smith, 3967. A. Steer and E. Reeve, 4166. W. W. Legrande, 4235. P. Jensen (com.), 4291. C. Warren and J. O'Keefe, 4319. P. Hamer, 4345. A. Wrigley, 4349.

Resins, &c.—J. T. Way, 4035.

Retorts and Crucibles, &c.—W. J. Warner, 3953. E. P. H. Vaughan (com.), 4252.

Road making and paving, Cleaning Streets.—J. P. Batch, 4120. J. C. Russell, 4153. J. Norris, 4262. W. R. Lake (com.), 4284.

Ropes, Cordage, Twine, Oakum, Wire Ropes.—H. Conradi (com.), 3909.

Safes, &c.—A. Steer and E. Reeve, 4166.

Sewing and Embroidering.—W. Carlile, 3930. T. Coleman, 3944. E. G. Brewer (com.), 4002. T. P. Bache, 4045. J. H. Johnson (com.), 4136. H. Gardner (com.), 4138. J. Morton, 4195. H. Guthrie, 4276. A. Watkins, 4326. C. Powers, G. Perkins, and C. Wilson, 4344.

Shears, Scissors, Clipping and Shearing Animals.—L. A. Pickop, 4128. W. Clark, 4256.

Ship and Boatbuilding.—R. Hunt, 3960. H. F. Craggs, 4163. C Bohn, 4355.

Ships' Cargoes (loading and unloading).—H. F. Craggs, 4163.

Shot, Shell, Bullets, and other Projectiles.—R. H. Courtnay, 4216.

Shuttles.—J. T. Gomersall and T. Copley, 3987. H. Gardner (com.), 4138. J. Morton, 4195. J. Haddock, 4525.

Signals, Alarms, Communicating Apparatus, Conveying Sounds.—P. Jensen (com.), 3904. B. Hunt (com.), 4059. H. O. Fisher, 4082. G. Schofield, 4107. G. Zanni, 4232. J. Mackrill and J. Holroyd, 4274. A. Wrigley, 4349.

Skates, Skating Rinks.—F. Wirth (com.), 4061. W. R. Lake (com.), 4180.

Smoke (Preventing, &c.)—R. Searle, 4106.

Soap.—E. P. Alexander (com.), 3898. H. Simson (com.), 4158.

Sowing Seeds, &c.—W. Sargeant, 4295.

Spades, Shovels, &c.—T. Warsop, 4255.

Spindles; Spindles and Flyers.—T. Wrigley, 3916. G. Sonnenthal, 4096.

Spinning and Preparing for Spinning.—J. Carr T. Waring, 3899. J. Beaumont, 3912. T. Wrigley, 3916. A. Greenwood, 3969. W. P. Thompson (com.), 4050. A. M Wade (com.), 4042. G. and E. Ashworth, 4091. J. Press and W. Young, 4110. P. Burns, 4132. A. Browne (com.), 4177. J. H. Leather and W. Whalley, 4225. W. Stewart, 4231. J. Boyd, 4241. E. Wilkinson, 4311. T. Brookes, 4315. E. Dyson, 4318.

Springs.—E. T. Hughes (com.), 3937. W. H. Walker, 4024. R. Hunt, 4145. H. L. Corlett, 4308.

Stables, &c.—J. Norris, 4262.

Stacking Agricultural Produce, &c.—J. Kent, 4253.

Stamps, Stamping, &c.—A. Tremeschin, 4186. F. W. Fryer and W. R. Head, 4240. J. Henderson, 4302.

Steam and other Boilers, Cleaning and Preventing Incrustation of Boilers, Water Feeding Apparatus for Boilers.—J. Wotherspoon, 3946. R. S. Boyer, 3951. G. A. Cates and T. Hayward, 3979. E. Hamer, J. Metcalfe, and E. Davies, 4014. J. Steven, 4015. A. Orme, 4016. W. J. Fernie, 4047. W. Dilworth, 4066. E. de Pass, (com.), 4104. J. Steel, 4194. J. Dalby, 4204. R. C. Anderson, 4306.

Steam Engines (Stationary, Locomotive, and Marine.)—Hon. C. A. Parsons, 3905. H. Simon (com.), 3926. J. Apsey, 3954. J. Apsey, 4003. J. E. Outridge, 4012. J. J. Turner, 4080. G. Albebon and J. Taylor, 4122. T. C. Watts, 4165. J. Brownlee and D. Rowan, 4175. H. P. Holt, 4178. W. F. Goodwin, 4199. J. Wood, 4212. J. C. Willsher, 4216. B. Sudlow (com.), 4234. A. M. Clark (com.), 4283.

Stone and Slate, Artificial Stone and Marble, Grindstones and Millstones.—G. Dalton, 4315. C. M. Lloyd, 4143. J. Knowles, 4273.

Straps, Driving Bands, and Belting for Machinery.—J. H. Johnson (com.), 4312.

Sugar and Syrups, &c.—A. Lyle, 4290.

Telegraphs; Telegraph Printing Apparatus.—J. M. A. Stroh, 4133. G. Zanni, 4232. J. K. E. Sieur, 4321. A. G. Bell, 4341.

Testing the Strength and Quality of Materials.—F. Wirth (com.), 4010.

Thermometers, Barometers, &c.—H. Hull, 4207.

Threads and Yarns.—L. Burns, 4132.

Tobacco and Snuff, Cigars, Cigar-holders, Pipe and Cigar-lighters, Smoking-pipes, Tobacco-pouches.—H. R. Smith, 3941. A. Strauss, 4336. S. F. Ralston (com.), 4352.

Torpedoes. A. W. Newton (com.), 4250. J. Nock, 4301. E. Bohn, 4355.

Tramways and Tramway Carriages, Tramway Locomotives —J. Fisher and B. Elliott, 4924. J. J. Halcombe, 3950. J. Apsey, 3954. C. L. Light and H. Merryweather, 4013. R. Ballie, 4072. H. P. Holt, 4178. J. Wood, 4212.

Trimmings.—C. Bach, 4221. R. Davis and E. Whitehall, 4300.

Turning; Lathes for Turning.—E. J. Brewer (com.), 4002. W. Henderson and W. B. Twiner, 4170.

Umbrellas, Parasols, &c.—T. Widdowson, 3971. W. Mellis, 4011. P. Constantine, 4131. R. Harrington, 4203.

Upholstery (Mattresses, Beds, Cushions, Curtains, &c.)—J. L. Hodgkins, 4161.

Valves, Taps, Stop Cocks, Plugs; Regulating the Flow and Pressure of Fluids.—Hon. C. A. Parsons, 3905. W. Anderson, 3919. J. Dewrance, 3922. G. F. L. Meakin, 3990. J. Steven, 4015. A. Orme, 4016. H. Lezins and Zabel, 4139. J. Howard, A. F. Wilson, and H. W. A. Kingdom, 4154. A. H. Hart and J. J. Potter, 4156. F. W. Shorey (com.), 4202. J. Dalby, 4204. M. A. Staake, 4219. A. and C. Stewart, 4269. J. J. and W. Tylor, 4297. J. McInnes, 4304. R. C. Henderson, 4306. W. Hanson, 4307. S. Robertson, 4309. G. Brocklebank, 4331.

Velocipedes.—B. E. Howard, 3934. J. Harrington, 3940. J. H. Smith, 3958. J. N. and T. J. Law, 4246. W. Atcheson, 4260. C. Hutton, 4335.

Ventilation; Supplying and Purifying Air for Buidings, Mines, Ships, Carriages, &c.—R. Meldrum, 3935. F. T. Bond, 3948. T. G. Messenger, 4057. E. C. Banner, 4083. R. Searle, 4106. R. Boyle, 4150. C. S. Robinson, and G. Goldsmith, 4333. J. Sturgeon, 4350.

Washing, Cleansing, and Wringing Fabrics, Yarns, and Materials.—A. Mudgall, 4145.

Waterclosets, &c.—J. W. Benn, 4102. W. Martin, 4115. J. and E. Morris, 4198.

Waterwheels and Engines, &c. — E. G. Brewer (com.), 4002. T. C. Watts, 4165. H. A. Burns, 4209.

Wearing Apparel for Gentlemen, Military Outfits, &c.—J. H. Johnson (com.) 4006. D. Harris, 4200.

Weaving, Braiding, Plaiting, Preparing for Weaving.—J. Yates, 3927. G. Burslem, 3949. W. H. Hacking, 3952. W. Anderson, 3973. J. F. Gomersall and T. Copley, 3987. J. and G. Howarth, 3989. J. Sharp, C, Haht, and C. E. Lebriesch, 4030. J. and J. E. Newton, 4092.

Wheels for Carriages, &c.—R. E. Howard, 3934.

Winding, Reeling, and Balling Yarn and Thread.—A. M, Wade, (com.), 4042. J. Boyd, 4241.

Windows and Sashes, &c.—J. Rawlings, 3962. W. P. Thompson (com.) 3970. J. Rawlings, 4063. W. H. Ashworth, 4171. A. M. Clark (com.), 4268. G. A Biddell, 4285. J. T. Harris, 4337.

Wire-Working, Wire Ropes, Telegraph Cables.—H. Conradi (com.), 3909. J. Harrington, 3940.

⁂ *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

Reviews.

QUARANTINE.

"The General Subject of Quarantine, with Particular Reference to Cholera and Yellow Fever." By JOHN M. WOODWORTH, M.D., Surgeon-General, Mercantile Marine Hospital Service, U.S.A. Extracted from the Transactions of the International Medical Congress, Philadelphia, September, 1876. Philadelphia, 1877.

DR. Woodworth in this little work deals with a subject that may be truly termed *vexata questio*, and he does so in a thoroughly scientific and practical way, but our space will not permit of our doing more than presenting our readers with his conclusions and the very pertinent observations which immediately precede them. It must be admitted (Dr. Woodsworth observes) that the germs of infectious diseases may elude the most vigilant sanitary supervision of shipping which can be devised; hence the importance of municipal co-operation, to the end that all exposed cities may, through wisely directed sanitary measures, be rendered less susceptible of infection. The value of sanitary supervision of ocean-travel and traffic, and of preventive measures at home, is more and more recognised by civilised nations, and the enlightened and vigorous prosecution of these means gives hopes of rendering exposed countries less liable to infection; but the repeated battles against cholera and yellow fever should awaken an international spirit, and a determination to carry the war upon these diseases to their endemic homes, and to there instruct the people, and if need be compel them, to employ rational means of prevention.

Considering what has preceeded, the following conclusions appear to be justified:—

I. The supervision of ocean-travel ought to be directed to securing good sanitary conditions for vessels at all times, out of as well as in port.

II. A system of Port-Sanitation should be adopted and administered for each country or place, separately, and should be modified in particular cases by taking into account the liability of the port to infection, the period of incubation of the disease, the length of time consumed in the voyage, and the measures enforced by the vessel *en route*.

III. In some countries, the detention of passengers and crews of ships hailing from infected ports is warranted, but for such time only as is necessary to complete the period of incubation of cholera or of yellow fever, counting from the date of departure from an infected port, or of landing from an infected vessel; in no instance should passengers or sailors be held for observation on board an infected vessel, and such vessel should not be detained beyond the period required for inspection, and for thorough disinfection and cleansing.

IV. Recognizing the fact that the morbific causes of infectious diseases may sometimes elude the most vigilant sanitary supervision of shipping, the importance of wisely directed internal sanitary measures can scarcely be overestimated.

V. As far as America is concerned, it is desirable that prompt and authoritative information should be had of the shipment of passengers or goods from districts infected with cholera or yellow fever, thereby insuring the thorough disinfection of infected articles.

VI. The endemic homes of cholera and yellow fever are the fields which give the greatest promise of satisfactory result to well-directed and energetic sanitary measures, and to this end an international sentiment should be awakened, so strong as to compel the careless and offending people to employ rational means of prevention.

The above Conclusions were, it appears, subsequently adopted and reported to the Congress as expressing the opinion of the Section on the subject.

THE SAFETY OF SHIPS.

"The Safety of Ships and of those who Travel in Them." By JOHN M. WOODWORTH, M.D., Supervising Surgeon-General, United States Marine-Hospital Service. A Paper read at the Annual Meeting of the American Public Health Association, held in Boston, October 5th, 1876. Reprinted from Vol. III. Public Health Papers of the American Public Health Association. Cambridge, U.S.: Printed at the Riverside Press. 1877.

THIS tractate is worthy of earnest attention for its subject is of interest to almost everyone, for who is it that does not sometimes travel by sea, or has not some dear friend or relative who does so.

The author makes the following statements as to safety in ships in the United States, to which the scope of his work is restricted.

Let us, says he, inquire what the Government has done and is doing to protect our ships, and those who travel in them. Under the power given by the Constitution of the United States, Congress assumed charge of all aids to navigation by act of August 7, 1789. During the colonial period, lighthouses were established at twelve principal points on the Atlantic coast, from Portland, Maine, to Charleston, South Carolina; but under the wise policy adopted and steadily maintained by the Government in respect of this service, the number of light-houses and stake lights is now 934. There are besides these, 30 light-vessels; 53 fog-signals, operated by steam or hot-air engines; 413 day-beacons, and 2,971 buoys. Twenty-eight small vessels are employed as tenders. Some of the ablest scientific men of our time are employed in perfecting this great system of guides set up on the highways of commerce, and maintained free of expense, not only to our own vessels, but to those of every nationality.

The Light-house Board are now experimenting with an automatic signal-buoy, invented by a citizen of New York, which not only promises to make every dangerous rock "speak for itself," but by different tones, or interrupted blasts of sound, enable the mariner to determine his position in the densest fog or darkest night. With the ordinary groundswell, this buoy has been heard from seven to nine miles.

The Signal Service is of recent application as an aid to commerce. Through a system of signal flags, displayed at our principal ports, it warns the seafarer of approaching storms, and through its instrumentality many disasters are averted.

The Coast Survey began in 1807, when the President was authorized to cause a survey to be taken of the coasts of the United States within twenty leagues of any point of the shores. This service has been conducted with great ability and vigour. It supplies the navigator with correct guides to the actual channels, which in many of our harbours are so changeable as to demand constant watchfulness. The Coast Survey Service has published a "Coast Pilot," which contains, for ready use by the seafaring, a digest of the information laid down on the charts. It is in the approach to the shore that the dangers begin; but thanks to the liberal wisdom of the Government in this direction, the captain, through the well-directed labours of the Coast Survey, is forewarned and forearmed.

The Life-saving Service of the United States was inaugurated in 1850, but its establishment on its present efficient basis dates from 1871. The life-saving service stations now in operation number 135, with about 965 men employed; and twelve more stations are in process of erection. Since the present organization was begun, in 1871, up to the present year, 281 vessels have been driven ashore upon the line of coast protected by such stations, having on board 3,240 persons, of whom 3,197 were saved, and forty-three were lost.

The revenue vessels of the United States, numbering thirty-four, in addition to protecting the revenue, render efficient service to vessels in distress. Under the act of December 22, 1837, the President annually designates about ten of these vessels to cruise during the inclement and dangerous season, specially prepared to render assistance to distressed mariners; and under these orders they are constantly cruising (not going into port except when absolutely necessary) from December 1 to April 1. In the year 1875, 195 vessels in distress were assisted by the revenue vessels, and eighty-one persons saved.

The Marine-Hospital Service, though directly concerned in restoring the sick and disabled, could, through its medical offisers, ascertain the physical condition of seamen before shipping, and thereby prevent unseaworthy sailors from endangering the safety of vessels as they now do.

The remarks as to the further improvements in regard to Governmental action are worthy of earnest consideration. They are in tenor much the same as those suggested for this country by Mr. Plimsoll and his friends, which have already been noticed in our columns.

ROCKS AND ROSES.

"Rocks and Roses." BY VINCENT. W. Poole, Paternoster Row.

OUR attention has been drawn to this work because there is something new in the boards and printing. The former are of the five shilling drawing-room book style, so far as being gilt on upper side is concerned, but they are unusually thick and bent at the edges; and the print is very large and deeply leaded, which signifies large space between the lines. It is therefore very easy to read and likely to be appreciated by short-sighted people. The get-up is rather rough. However, many of the public will like the articles for railway reading. The subjects are fiction of the general American school, and interesting *sui generis*.

LAURIE'S SHILLING SCIENCE TEACHERS.

"Laurie's Shilling Science Teachers." Stuart Laurie School Depot, Paternoster Row.

THESE are very neat books, like most of those issued at the above depot. We have seen some of the first of the series, of which preliminarily one consists of an excellent collection and digest of the Elementary (School Board) Acts. Another is a kindergarten manual, the principle of which is to alternate instruction with an ingenious or amusing puzzle, illustration or anecdote. The treatment of science is simplifying.

CRUCHLEY'S MAPS.—SHAW AND NORTON'S TOURIST GUIDES.

"Cruchley's Maps; Shaw and Norton's Tourist Guides." Gale and Inglis, Paternoster Row; Shaw and Norton, Garrick Street.

THE first of these works has been acquired by Messrs. Gale and Inglis, and many of them are familiar, through their yellow backs, in the stationers' windows. The one of London with boards is cheap, and deserves praise and patronage of strangers for facility of reference. Those of the English counties go seriously into detail, every hamlet being clearly located. There are neat maps, and one of the seat of war is also valuable for its detail. The publishers of the second are known as promoters and conductors of tours, more particularly in Ireland. These little works contain numerous pretty illustrations of Irish scenery, and deserve patronage on that account. Some new volumes have been lately issued. With these are given Cruchley's Maps. A large sheet of time tables, includes those of Messrs. Shaw and Norton's Irish stage cars.

ACOUSTICS.

"Acoustics." Collins and Sons, St. Bride's Avenue.

We have pleasure in noticing this work, which is one of a new series of science manuals or teachers. A work in this kind of philosophy naturally depends a good deal on illustrative drawings to make it intelligible; and this work supplies very fairly the absence of the blackboard and teacher or professor. That important organ, the ear, is very fully illustrated, as are also the lines and waves of sound. The tendency of the work, like that of some of the other educational works we have reviewed this year, is to make scientfic knowledge attainable in a short time. The time, however, happily has not come for warning against an abuse of this tendency which might lead to superficial knowledge.

THE PRACTICAL DICTIONARY OF MECHANICS.

"The Practical Dictionary of Mechanics." By Edward H. Knight, Civil and Mechanical Engineer, U S. London: Cassell, Petter, and Galpin. United States: H. O. Haughton & Co., the Riverside Press, Cambridge, Massachusetts.

We have already made our readers acquainted with the existence of this valuable work, and now that more than ten parts of the issue of it in a serial form have appeared, the present seems a proper occasion to speak out in a more definitive way.

That the Dictionary form is the one which will render any work of general research useful to the fullest extent cannot be doubted, and when the information conveyed is thoroughly reliable, a work must, for practical purposes, be as near to perfection as can be hoped for by anyone.

We have carefully perused various parts of this work, and have no hesitation in recommending it to our readers.

HISTORY OF THE LIFEBOAT.

"History of the Lifeboat." By Richard Lewis, Esq., Barrister at Law, Secretary of the National Lifeboat Institution. Macmillan and Co.

This is only nominally a work of philantrophy, for it abounds in technical particulars about the lifeboat as it was, and is, and the appliances used in saving life from shipwreck and drowning. We are told that it is almost within the memory of living men since the lifeboat was introduced. A patent was taken out in 1785 for the unimmergible boat, but it was not much adopted, though it ought to have been. Mr. Greathead was the inventor of lifeboats. In 1789 a boat was constructed differing from the one described in shape of keel, and in substition of cork for side-air chambers. The formation of the National Shipwreck Society followed. In order that in any part of the world a modern boat of the Royal National Lifeboat Institution may be constructed working drawings are given. This boat is 33 feet by 8 feet. There are ten oars to pull double-banked; the weight is 53 cwt.; sheer of gunwales 2 feet 4 in.; depth of stem and stern-post 6 feet 4 in. The boat is built diagonally, and has copper fastenings, payed with white lead or thick paint; holding two screw valves let into that piece which comes into the deck from the outside. A coat of Jeffrey's glue is laid on the top of the air-cases, and then covered with canvass, and glue used through the latter by means of a hot iron. The pores of the cork are filled with bees-wax and varnish thoroughly rubbed in. The trunks to receive the relieving tubes to be framed in 1 1-eight mahogany self-acting valves of gun metal made by Darling, of Queen-street, Blackfriar's-road. Air-cases must be framed with a ½ cant English elm. The account of the lives saved is thrilling.

CASSELL'S DOMESTIC DICTIONARY.

This serial is progressing in a very satisfactory way, and we feel no hesitation in saying that it is a book that ought to be found in every Englishman's house.

Correspondence.

"STRONG ENOUGH TO FELL AN OX."

Sir,—The above is an expression which (we know very well) is only applicable to any very athletic and sinewy individual; yet the difficult and dreadful duty of felling an ox is often intrusted to men of only average strength, and perhaps less than average compassion. Not on them should we cast the blame of prolonging the poor animals' suffering. The skull and skin and hair of some oxen are so extremely thick, that it is quite impossible for the arm of one man to inflict a merciful, because speedy death.

The hardened criminal who has murdered his brother man in cold blood, is far more mercifully dealt with, than the innocent victim who dies to give us food. The criminal has all the advantage of the patent "drop," length of rope, height of fall, and a skilful executioner, to alleviate the agony of his death throes, whilst the patient gentle bullock may have his suffering prolonged to any extent. Who's to blame? Will no one invent a simple apparatus that can inflict instant, and almost unfelt slaughter?

We have machinery for the most trivial, as also for the most tremendous purposes, whenever our own interest and welfare are concerned. We launch a mighty ship by the movement of a button. We blast the stupendous rocks by a spark. We make the lightening our letter carrier, and the steam our slave. We work miracles of mechanism. Hear the other side. We have machines for shelling peas, stoning cherries, threading needles, sticking stamps, brushing our hair, &c., yet it remains for the unaided arm of man to inflict lingering death, because no one takes the trouble to prevent it by mechanical aid. Oh, John Bull, John Bull, the blame is yours! for thus neglecting your "poor relations."

Although you are better than some of your neighbours in these matters, you have taken up the cudgels against Vivisection and cruel torturing harness, and shameful beating: you have provided drinking fountains and other animal comforts; I entreat you to listen to a woman's weak voice and do something to minimise the misery of the slaughter house.

Can't you invent a simple kind of inverted Guillotine, that will instantaneously sever the head from the body? or a weight that shall fall with an unerring blow upon the forehead, and cause complete insensibility in a moment? I am told that as many as seventeen blows with an axe must be given ere the poor creature can be deprived of consciousness! "They manage these things better in France," and in Portugal too, they have much quicker methods of taking animal life.

I think we have little reason to boast of the Roast Beef of Old England, so long as we allow the living beef to suffer prolonged and unnecessary pain.

Yours faithfully,

Cotham, Bristol. E. J.

MONT BLANC.

Monarch of mountains! now I gaze on thee,
White with the snows of never-ending years,
Where pillow'd on the cloud in splendour peers
Thy summit lit with glory, bright and free,
As the day dawns in greater majesty!
Seeming to touch the heavens as twilight nears;
Where halo'd o'er thee, the blue sky appears,
And crowns thee with her glorious canopy.
Around the bends and waves the giant pine,
Nurs'd 'mid thy snow, and adamantine rock:
Save, when the mighty avalanche, and winds combine
To hurl him from thee with re-echo'd shock!
Grand in the day-dawn, or at even-shine,
And when the lightnings flash and thunders mock.

Henry George Hellon.

Chamonix.

THE USES OF FISH SKINS.

Although the skin of some marine mammals, such as those of the seal, walrus, and the white whale or beluga (known as porpoise leather), have long been commercially employed, it is only lately that attention has been more generally directed to the utilization of fish skins on an extended scale. Their employment hitherto has been very limited. Eel skins have been used for the thongs of whips and the attachments of flails, dried sole skins to clarify coffee, and some shark and ray skins by workmen to smooth and polish substances, and also to make a kind of shagreen leather.

At the Maritime Exhibition held at the Westminster Aquarium this year, Mr. G. Kent, of Christiana, Norway, exhibited a variety of tanned skins, among which were:

1. Whale skins tanned; the size ranges from 12 inches broad by 60 feet in length, suitable for wheel bands, for driving machinery, etc.

2. White fish, for upper leather, which can be prepared in pieces of 12 feet by 4 feet.

3. Skins of various flat fish, dressed and prepared for gloves. Fine upper leather can be made, often to be had in sizes up to 3 feet square.

4. Skins of soles dressed and tanned suitable for purses, etc.

5. Skins of thornbacks, suitable for cabinet makers instead of sand paper, and very much more durable.

6. Skins of eels, dressed and dyed, suitable for braces and other purposes.

In Mon. Chas. Varey's "Scientifique Correspondence" from Paris, of August 7, mention is made of an industry carried on at Colburn, in Canada, in the skins of species of silurids for glove making, and this is to be prosecuted on a larger scale, both for the flesh for salting and the skin for currying.

Shoes have been made in Gloucester, Massachusetts, from the skins of the cusk or torsk *(Brosmus vulgaris)*, the use of which has been patented. If this material for shoes proves what it promises, it will open up a new market for fish skins, which will no doubt be highly profitable. In Egypt, fish skins from the Red Sea are used for soles of shoes. In the Animal Products Collection at the Bethnal Green Museum there are some tanned sole skins shown. The skin of the losh or burbot *(Lota maculata)*, cleansed, stretched, and dried, is used by country people in many parts of Russia and Siberia to trim their dresses, and instead of glass for the windows of their dwellings, being as transparent as oiled paper. It is also utilized by some of the Tartar tribes, as material for their summer dresses, and the bags in which they pack their animal skins. The inhabitants of the eastern coasts of the middle of Asia clothe themselves with the tanned skins of the salmon. It is asserted that it makes a leather as tough as wash leather. The scale marks give a very neat pattern to the leather.

W. Brozowsky, in his "Waarenkunde," Vienna, 1869, under "Fish Skin," says it is obtained from the sea angel (*Squalus squatina*, Lin.; *Squatina lævis*, Cuv.), the thorny shark (*Squalus acanthias, Sq. carcharias*), the tigered shark (*Sq. caniculata*), and some skates, as the angel skate (*Raja rhinobatis*) *Rajo Sephen*, etc. The skins of these skates and sharks have spines of different sizes instead of scales. The skins are used for polishing, and, after the star-formed spines have been smoothed down with sandstone, for covering boxes and cases, etc.

The "Waaren Lexicon" of T. C. Schedel enumerates the following fishes: Sea dog (*Squalus blainvellei*, Riss, Aiguillat, Blain), *Sq. aranthias*, and other small sorts, *Sq. carcharias*, Lin., *Sq. canicula*, and *Sq. catullus*.

Guibourt (sixth edition, by Dr. G. Planchon, 1870-71, vol. iv.), says, "The sephen of the Red and Indian seas, belonging to the genus *Trygon*, produces the tuberculous and hard skin called galuchat, after the name of a Paris workman who employed it first. The greater part of the selacians, namely, the rousettes, sharks, humantins, aigullats, leiches, etc., have a rough skin, which is used for covering boxes, and also for polishing wood. The greatest confusion exists among merchants as to the names given to the different skins. Each tradesman applies, according to his fancy, the name of *peau de requin*, *peau de chien de mer*, *chagrin*, and even *galuchat*. I endeavoured to obtain specimens of the various skins, in order, if possible, to determine the species.

"1. Shark skin, from a young shark; small, imbricated scales, somewhat translucid, with longitudinal lines, the borders or edge entire and circular. The edge is free on the body, but attached on the fins. The skin serves for covering cases, etc., but is not rough enough for polishing.

"2. Skin of mottled *roussette* (*Scyllium*, Cuv.). Tuberculous, imbricated, horny, fine and hard scales, very near one to the other, and transparent, each triangular. Skin much used for polishing. Some persons state that 'false galuchat' is made of it by rubbing off the scales, which leaves a square figure that becomes very showy when the skin is applied on a green paper. I rather believe (continues M. Guibourt) that the false galuchat is made with the skin of the aiguillat.

"3. *Peau de leiche* (*Scymnus*), sold to cabinet makers under the name of *peau de chien de mer*, is covered with nearly rhomboid tuberculous semi-transparent scales, arranged one near the other in quincunxes.

"4. *Peau d'aiguillat* (*Spinax acanthias*, Cuv.). Viewed with a magnifying glass, this skin appears covered with small square opaline scales, not rough like the preceding, but much used by the 'gainiers' or sheath makers, for its glossy nacreous aspect.

"5. *Peau de sagri* (*Spinax niger*, Cuv.). Same uses as the preceding. The word *Sagri* is Persian; *Sagher*, Turkish, from its resemblance to the dressed leather made from the mule and ass, whence our word shagreen.

"6. *Galuchat* or *sephen* skin, from the back of the *Trygon sephen*, Cloq. It has numerous round tubercles, which become white by rubbing down, and in the interior opaque and nacreous. The skin is sometimes dyed for different colours, but it is often preferable to leave it the natural colour by only half polishing it."

The quantity of ray skins, dried or salted, imported into France in 1863 was about 18,000 lbs. weight, principally from Portugal. Formerly they used to fetch as high as 7 francs the pound, now they may be had for 1s. a pound.

The best galuchat, or what we should call shagreen, is made from the skin of the sephen, which abounds in the Mediterranean Sea, and is also met with in the Red Sea and the Indian Ocean. This skin is remarkable for the size of the osseous protuberances. There are, however, two kinds of these rays, one with rough skin and the other with smooth.

From a certain portion of the skin of the angel shark (*Squatina angelus*) the Turks make the most beautiful sea-green watch cases. These sharks, which form a connecting link between the genera of rays and sharks, are found in the Mediterranean principally, and the German Ocean sometimes. The skin being very rough, it is employed to polish wood and ivory, as well as for other uses in the arts.

Turners, ebonists, and carpenters in Europe use the rough skin of the blue dog fish (*Squalus glaucus*, Linn.) like emery paper, for smoothing their work and preparing it for polishing. This shark skin is also used by the native workmen of the East for polishing wood and ivory, and it is made into shagreen. The best is that obtained from the *Rai Sephen* of India and the Red Sea. That most used now seems to be the skin of the ray (*Hypolophus Sephen*) which is very common on the Malabar coast, and an extensive commerce is now carried on in them in the Indian Ocean; they are found in the Sea of Oman, and also taken at Mahe. The house of Giraudon, 48, Rue Molière, Paris, makes excellent use of them for morocco and tabletterie.

Peau de Roussette (*Squalus catulus* and *caniculus*, Lin.) This fish, called *chat* at Marseilles, and *crin* in Catalonia, is smaller than the angel fish. The skin, reddish, and without spots, is of a uniform grain, flat, and only used to make cases and other articles known as shagreen. These skins come from the Mediterranean, and are imported in bundles by the sailors, selling, according to size, from 30s. to 36s. the dozen.

Peau de chien de mer is another name given in France to some species of *Squalus* or *requin*. That usually found on the French coasts is known under the names of *chien marin, chat marin, roussette tigrèe (Squalus catulus*, Linn.). Turners, cabinet makers, and carpenters use the skin for scraping and smoothing their work before polishing; metal workers and others also use it. This skin, when worked up with the tubercules with which it is studded, takes the name of galuchat, and is ordinarily dyed green, to cover cases, sheaths, and boxes. Under the name of *chagrin* these skins used to be much employed in Turkey, Syria, Tunis, and Tripoli. That made in Constantinople was considered the best. It was coloured black, green, white, and red.—*By P. L. Simmonds, in the Journal of the Society of Arts.*

REVIEW OF THE PROGRESS OF STEAM SHIPPING DURING THE LAST QUARTER OF A CENTURY.

By Mr. Alfred Holt, M.Inst. C.E., of Liverpool.

In the period above referred to it might be broadly stated that British carriage by sea has been transferred from sailing vessels to steamers. The production of steamers has been greatly fostered at the commencement of the period by the remunerative nature of the transport services during the Crimean war. Three changes of construction rendered this extension possible. There were —the Screw Propeller, the Iron Vessel, and the Compound Engine. The peculiar merits of the screw propeller were, that it was equally effective at varying drafts, that it was indifferent to rolling, and that it was capable of being used either for low or high powers. By the construction of iron vessels much greater carrying capicity, in proportion to the power required for propulsion, was possible than could have been attained with wood. The process of lenthening the vessel, for the purpose of arriving at the greatest displacement with the least resistance, had gone through several interesting phases. Probably the most economical vessels were now somewhat of the following proportions:—Length, $7\frac{1}{8}$ times the beam; and depth $\frac{1}{8}$ to $\frac{5}{8}$ thereof. These vessels had engines of 1 nominal horse-power to 10 tons of gross register tonnage, and realised an average speed of $8\frac{1}{2}$ knots per hour. The compound engine was merely an application of long-enunciated ideas to appropriate purposes. The three properties of steam—direct pressure, expansion, and condensation — could, no doubt, be utilised for the production of power more economically in one cylinder than in two or more; but the circumstances suiting such application rarely presented themselves afloat. A long stroke, a deliberate movement of parts, and an arrangement of valves admitting great range of expansion, and therefore complicated in details, were necessary. The first and second were not practicable, and the third was inadmissible in a screw steamer; but where these could be obtained, as in the walking-beam engine of the American paddle-wheel boat, the duty performed for the fuel consumed approached very nearly to that of the best compound engines, although the pressures were much less. The Americans had consistently held to the single cylinder, and there was a laudable, and frequently most successful, daring in their designs. It was even a matter of reasonable speculation whether the compound engine might not yet be abandoned, and a return be made to the single-cylinder engine, modified in details to suit high-pressure steam. The various types of screw engines in use since 1852 were then described, accompanied by a statement of the consumption of coal in the different types, showing progressive economy, resulting in a consumption of just under 4 lbs. of coal per indicated horse-power per hour. This was, however, too great for long voyages to be remunerative, if exclusively supported by freight and passage-money. Hence, attention was directed to the use of high-pressure steam in two cylinders, the great pressure in a small cylinder and the small pressure in a large one. For many years Messrs. Randolph and Elder had constructed engines on that principle, and to that firm was attributed the introduction of the compound engines for marine purposes. The arrangement which had found most favour was the inverted type, with the cylinders alongside each other, and the cranks coupled generally at right angles. Another arrangement, now coming into vogue for large engines, was that with four cylinders in two pairs, each pair concentric, usually with the high-pressure cylinder on the top, and having one common piston-rod. There were many other arrangements, some with combined horizontal and vertical cylinders, others with three cylinders, and a considerable number with two cylinders adjusted as a single engine, one crank and a fly-wheel. As fresh water, or an approach to it, was absolutely necessary for high-pressure boilers, surface condensers were employed, and the cooling surface was generally provided in small thin brass tubes. The boilers varied in design, but the general type was similar (with the modifications necessitated by the higher pressure) to the old low-pressure boiler. The consumption of the best specimens of such engines as had been described varied from 2 lbs. to 2½ lbs. of good coals per indicated horse-power per hour. Increased economy must, in future, be sought in higher pressures, changed proportions, and improvements of detail. Twenty-five years ago twice as much fuel was required as was now burnt; if in the next twenty-five years 20 per cent. further reduction took place, it was as much as could be hoped for. Viewed from the side of the owners' pocket, coals were no longer the chief item of expenditure; there were other and heavier disbursements in which to effect a saving—wages, dues, insurance, repairs, &c. The indicator diagram was not implicitly to be relied on as a test of useful effect, though, as an instrument to detect faults, the value of the indicator was considerable. Simplicity of form, accessibility of parts, freedom from likelihood of derangement, and ease of repair, were becoming daily more marked features in the steamboat engine, even if these entailed slight departures from the most economical form. Forty days' continuous steaming, without a stop, was not an uncommon performance, and the longest distances in the world were now accomplished by steamers. The reason of the unforeseen failure of the auxiliary steam vessel was probably twofold. In such vessels the sailing department could not be economised, while it was practically impossible to keep the engine expenses in a reasonable proportion to engine services.

No review of recent steamboat enterprise and progress would be complete which does not touch on the part Government has played in various ways, whether (1) by subsidies for maintenance or assistance of mail services; or (2) by interference in design, condition, and equipment, on the plea of providing for public safety. Both were difficult problems, but unmixed good had certainly not been the result of this action. Postal subsidies brought lines earlier into existence, but postponed improvement. They were monopolies, the Government money being used to crush competition. In the Author's opinion, the day of subsidies is nearly over. The Board of Trade inspection had grown up from a simple survey to a minute and comprehensive inspection. This was attributable to the popular outcry for safety, and the resulting emotional legislation was the cause. The executive department of the Board of Trade professed dislike to much of this interference; nevertheless, its officers were instructed to survey so much in detail, and according to lengthy directions, as actually to amount to designing. The system was too new to have wrought much ill as yet; but resistance to novelties and preference for stereotyped forms might naturally be expected. The eccentricity of the laws was noticeable, of which one illustration might be given. The public rode with perfect safety behind a railway engine, the boiler of which contained steam of 120 lbs. pressure; whereas in a steamboat the pressure was restricted by law to about 70 lbs. Although, no doubt, a few persons had reaped considerable rewards, yet as a whole, and viewed over a series of years, ship owning had been a bad trade for most of those engaged in it. It was a matter of frequent remark, that profit and comfort were driven out of any trade a steamboat entered. In fact, the one who had almost alone benefited by the change had been the consumer.

[Abridged from a paper recently read before the Institution of Civil Engineers.]

THE TRACTION-ENGINE IN AFRICAN EXPLORATION.

Next to the war now raging in the East, the subject of African Exploration is one soon likely to attract the greatest share of public attention, more particularly since the splendid discovery made by Stanley that the Congo River (or, as he generously styles it, the Livingstone River) takes it rise amidst the great central lakes of Africa, already peopled to some extent by Europeans, and connected with Zanzibar on the eastern coast by tolerably well defined routes for travellers. Now, however, it has become known that for 3000 miles, or thereabouts, this mighty river is available for commercial and other purposes, and that thereby the passage round the Cape, or otherwise through the Mediterranean and the Red Sea, well be avoided, we think few will deny that the "Livingstone" is destined to become the great highwayof Central Africa, and we have therefore much pleasure in laying before our readers a plan thought out by Mr. T. L. Henly for exploring this river from mouth to source, and which has already been adopted by the Government for the transport of heavy guns, ammunition, &c., in time of war. Mr. Henly states as follows:—

The chief difficulties attending all such expeditions hitherto have been—

1. Loss of bullocks and horses through wild animals and the tetse fly.
2. Want of provisions, and dependence upon the natives for these, as well as of labourers to carry goods, &c.; who too often fail their employer at the very time their services are most needed.

I purpose substituting for these two light traction-engines fitted to burn wood, and supplied with wire-rope apparatus similar to that used in ploughing.

The carriages following each engine will be made of light wrought iron (or steel), and in the shape of a flat-bottomed boat, fitted upon an ordinary sleigh. Upon approaching soft ground the engine will travel into this by means of a gangway easily constructed, and the end of the wire-rope having been fastened to a small boat (if necessary), two men will convey it, together with a claw anchor, to the utmost limit of the same; they will then make it fast, and the engine, winding up the coil, will draw itself to the anchor, as a man would do in a ferry-boat crossing the river. In this manner mountains, no matter how lofty, can be scaled, rivers crossed, and swamps skimmed over. As for tetse fly, wild animals, or even hostile natives, I should not fear them much, as my carriages would be bullet proof, and I should take two or three years provisions with me. Twenty men well armed would I imagine be sufficient, as each engine would be capable of moving 20 tons with ease, and the carriages would be fitted with weapons of defence, just as a ship might be when going into action.

I estimate the whole weight of everything, when floating, at 15 tons. A barge on the river, 40 feet by 8 by 8, will carry 80 tons of coal, so that my land-ship, or Noah's ark, would not be at all unweildly. I consider this might be fitted with a pair of paddle-wheels, so as to steam against the current, and I should use the river whereever practicable. I purpose bartering with the natives all the way, and should my stock of goods in time exceed my carrying power, I should pack the surplus on rafts, and tow them after me, whilst, when on land, my engine having travelled forward by itself, would draw any number of rafts singly to that point by means of the wire-rope as in ploughing. I purpose taking with me a balloon for surveying purposes. This could be attached to the wire-rope, and sent up, and would be useful also, if necessary, as a means of defence.

I estimate the total cost of such an expedition at £5000, and as an elephant's tusk worth £30 can be purchased for a pound of glass beads, the profits realised should be very great.

I am willing to take charge of such an expedition, or assist others in doing so, taking my renumeration for this out of profits hereafter; and I shall be glad to hear from any persons willing to form themselves into a "Limited" Company for the purpose of carrying out these suggestions.

T. L. Henly.

429, Oxford St., London.

PS.—Seven years roughing in the backwoods of Virginia, and "The Camp" at the River Plate have, I consider, qualified me for this work.

Artificial alizarin has fallen considerably in price, owing it is said, to the prohibitive duty imposed on its importation into Russia.

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SESSION 1877—1878.

MEMBERS' MEETING.

Thursday, 13th December.—On Arrangements for Lowering Boats from Ships for Saving Life at Sea. By G. G. Laurence, Esq.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts. F. W. CAMPIN, Sec.

N.B. The movement for the REDUCTION OF PATENT STAMP DUTIES *is still on foot; those who wish to support it should at once communicate with the Secretary.*

Proceedings of the Institute.

THE Executive Council of the Institute has met during the past month under the presidency of Mr. F. H. Varley, Chairman of the Executive Council, and after the transaction of ordinary, financial, and other business, resolved that it was desirable to invite a number of members of long standing, who are well known in the world of invention and manufactures, to become members of the General Council of the Institute. Further that it would be desirable to nominate several gentlemen as honorary members.

On November 28th, the Inventors' Dinner, for Members of the Inventors' Institute and others, took place at St. James' Hall, but want of space prevents our giving a report of the proceedings thereat in our present issue. As the dinner was considered to be the opening of the session, no meeting took place on the 29th November.

Monthly Notices.

The Sixth Annual Report of the Meteorological Office of the Dominion of Canada, published at Toronto, has reached here. It contains particulars of meteorological statistics for the whole Dominion, prognostication of weather, storm-warnings, daily chart of probabilities, an account of the way in which the work is carried on in the Central Office, a map, and a long series of well-arranged tables.

Prof. Besold, of the Polytechnic School of Munich, has recently published a work "On the Theory of Colours applied to the Arts and to Industry." He differs in many respects from Chevreul, from Helmholtz, and from Maxwell, but his views are deserving of every attention, and an English edition of his "Theory" has been published in America. There is also an article on it in the 'Moniteur Scientifique Quesneville,' for October.—*Athenæum.*

Mr. R. S. Culley, who recently retired from his post of Engineer-in-Chief to the Post Office Telegrsphs, is at present preparing a revised and greatly enlarged edition of his "Handbook of Practical Telegraphy," the well-known sixth edition, which has been translated into various foreign languages, now being out of print.

Another small planet is announced by telegram from America, the discoverer being Prof. Watson, of the Ann Arbor Observatory Michigan, U.S. This will probably reckon as No. 178.

The Life Boat, or Journal of the National Life Boat Institution continues to present its readers with interesting information, and heart-stirring narratives as to life boat services.

The Medals of the Royal Society have been awarded as follows:—The Copley Medal goes to Prof. J. D. Dann, of Newhaven, Connecticut, for his biblical, geological, and mineralogical investigations, carried on through half a century, and for the valuable works in which his conclusions and discoveries have been published. Mr. F. A. Abel, F.R.S., the newly created C.B., is to have a Royal Medal for his physico-chemical researches on gun cotton and explosive agents; and when we bear in mind the diligence and intelligence with which these researches have been carried out during many years, and the admirable papers thereupon published in the "Philosophical Transactions," we may safely predict that this award will be generally approved. A Royal Medal is awarded to Prof. Oswald Heer, of Zurich, for his numerous researches and writings on the Tertiary plants of Europe, of the North Atlantic, North Asia, and North America, and for his able generalizations respecting their affinities and their geological and climatic relations. And for the first award of the Davy Medal, Robert Wilhelm Bunsen, of Heidelberg, and Gustav Robert Kirchhoff, of Berlin, are selected, in recognition of their researches and discoveries in spectrum analysis. This is a good beginning with a medal which is, perhaps, destined to become famous in the history of science. There will be no question as regards custody of the golden prize, for each of the two learned professors will have a medal.

The death of M. Cazin is announced.—He was Professor of Physics in one of the colleges of Paris, and an active member of the Physical Society of Paris. M. Cazin was sent by the Academy of Sciences to the Isle of St. Paul to make physical observations during the last passage of Venus, when he contracted the germ of the fatal disease of which he has died, at the early age of forty years.—*Athenæum.*

Wilson's Patent Paddle Wheel Engine for River Steamers.—Messrs. Alexander Wilson and Co., Engineers, of the Vauxhall Iron Works, Wandsworth-road, London, S.W., are manufacturing engines peculiarly adapted for river steamers of light draught, which we reserve for fuller description on a future occasion.

Submarine Cable Statistics—Of submarine cables, private parties own 149; miles of cable 59,547; miles of wire 65,535 Governments own 420 cables; 4,442 miles of cable and 5,725 miles of wire. Norway has 193 cables, Sweden 4, Denmark 29, Holland 18, Russia 3, Germany 46, Turkey and Greece 13, Italy 12, Spain 6, France 26, and Great Britain 52. The Anglo-American Company has the longest submarine cable in the world, 2,585½ nautical miles, and has five Atlantic cables in all, besides twelve other cable, a total length of 12,315 miles.

TORPEDOES.

We confess that we rank ourselves amongst those who think that the quicker war is made highly dangerous and disastrous the sooner we are likely to arrive at the reign of universal peace; hence we favour the adoption of any and every invention that will add to the terrors of warfare. Holding this opinion, as we do, we need plead no excuse for presenting our readers with the following statements with regard to the torpedo system as developed in the unhappy contest now going on between Russia and Turkey, for which ~~we are~~ indebted to our eminent contemporary, the *Times*, whose correspondent with the Turkish Fleet, amongst other valuable observations, states that the Turkish torpedoes are of two kinds, the electrical and contact. The former, in different sizes, are made of boiler plate, cylindrical in form, of two-eighths of an inch of iron at the sides and three-eighths of an inch at the top and bottom, the requisite buoyancy being obtained by a thin partition called technically a diaphragm. In one of these partitions is the powder, while the other not only gives buoyancy, but also admits of the expansion of the gas requisite to insure the ignition of the whole charge of powder before the case bursts. As guncotton cannot be procured, a large-grain powder of excellent quality is used, which is manufactured at the Imperial Mills, outside Constantinople. A few, however, of the first placed were fitted with guncotton, which happened to be in store at Constantinople at the outbreak of the war. The fuzes consist of a piece of very fine platinum wire placed between the ends of the conductors. This is much the same as those used in our own service with electrical batteries. But there is an innovation in the Turkish fuze in the shape of a small piece of carbon, which becomes incandescent by the passage of electricity, which is placed in the centre of the platinum bridge by the wire being passed round it once or twice before being secured to the ends of the battery wires. The batteries are Le Clanchés, of the newest type, wherein manganese and charcoal surrounding the carbon plate, which forms the positive pole, are compressed together into a solid mass. The circuit closer system has not been adopted for either the Bosphorus or the Dardanelles. The battery and fuze form part of the circuit, and a double wire may either be used to connect them, or the sea itself can be made to serve the purpose of one of the wires, and thus effect a great saving of wire. In ordinary circumstances, then, there is always a break left in this circuit, and it is the closing of this break which produces the explosion at the moment required. With the circuit-closer this is brought about by the vessel which it is intended to destroy herself closing the breach, and there is thus no risk of a premature or late explosion. When circuit-closers are not used, then, in order to insure the explosion of the torpedo at the right moment, two breaks in the "circuit" are arranged, one at the battery and one at a second station, being the end of the base line, considering this point, the battery, and the torpedo to form a triangle. As each torpedo is being placed its direction is taken by a line of sight from each station, and so later on, when an enemy's ship appears, all that is required is for the observer at the second station to close the break when she is passing any one of his lines of sight, while the observer at the battery closes the break of the particular torpedo wire corresponding to the line of sight at his end of the base which the ship may be passing. Unless these two breaks are simultaneously closed there can be no explosion, and this can only happen when the ship is passing an alignment at each station, showing that she is over a torpedo and favourably situated for blowing up. These alignments are taken with instruments suitably arranged with telescopes and screws for the torpedoes. The telescopes carry long arms connected with the battery, which touch the ends of each torpedo wire as the vessel passes a line of sight, and so closes the break.

Besides these instruments there is another system of firing torpedoes by observation, which the Turks have adopted. It is called Siemens' Indicator, and though probably familiar to most persons who have studied torpedoes, is sufficiently novel to warrant an explanation. Two stations are chosen, from which a clear view of the ground to be defended can be obtained. At the one there is a table large enough to hold a good large sheet of paper, on which the positions of the torpedoes are to be laid down as they are placed by the mooring lighters, and at the other an electro-magnetic machine. The table at one end of it has a telescope fixed upon a pedestal capable of horizontal motion, and by means of a pointer which it carries the direction of the telescope is projected on the paper. At the other end of the table, or at some slight distance from the telescope and stand, there is another pointer made of the very lightest material possible, which is connected to machinery in the small box underneath the table. This machinery is set in motion by currents of electricity sent from the electro-magnetic machine at No. 2 station. At this No. 2 station, which the foregoing will have implied is connected with No. 1 station by an electric cable, there is also a telescope fixed on the top of the magnetic machine, and it is arranged that the turning of a handle will not only move the telescope, but cause the induction of currents of electricity. As each torpedo is being laid the observers at the stations, by preconcerted signals, bring the torpedo into the field of their respective glasses, upon which the two pointers will be found to cross over the paper on the table, for, just in the same manner as the hand moves round the dial plate of the telegraphic machine used in banks and large establishments inndicating the signals transmitted from other departments, so the pointer on the table moves in a direction precisely parallel to the telescope at No. 2 station. The other pointer moves also in the same manner as the telescope at No. 1 station, and thus there are two similar triangles of which the base lines are the distance between the two stations of the one and the short space between the two pointers at the table of the other. Each torpedo is observed in the same way, and the points of intersection being marked, a perfect chart of the harbour and the position of its torpedoes is easily projected. The wire of each separate torpedo is brought into a table near the battery, and there secured to what is called a firing key, an instrument permitting of rapid connection with the firing batteries. All that is now required is for two intelligent observers to watch the motion of the enemy's ships, while a third, with his eyes on the chart and his hands hovering over the keys, watches the motion of the pointers, and the moment he sees that the point of intersection coincides with any one of the numbers marking the position of the torpedoes, he fires that particular one, knowing that the ship must be over it.

The contact torpedo is a pear-shaped copper case, divided as the others into air-chamber and magazine. The only fuze used is an ingenious invention of a Mr. Frost, who for a number of years has been Superintendent of the Cartridge Department at Tophaneh. It consists of a cup of fulminate, into which a heavy plunger, with a point roughened to produce friction, falls immediately the torpedo is struck. This plunger is suspended by an india-rubber spring fitting into notches round the upper part of the fuze case, which contracts with vibration, and so releases it. It appears simple and efficacious, and not liable to get out of order by being a long time in position, and has advantages over the other system of a small vial of sulphuric acid breaking over a mixture of chlorate of potass and white sugar.

With regard to the Russian torpedoes, they are mostly made of copper, are conical in shape, and are filled with dynamite or guncotton. They are exploded in various methods, by electricity and by contact. The former of these are fired by means of an apparatus resembling a "circuit-closer," and requiring concussion to discharge them, or capable of being fired from the shore. With the conductors disconnected from the battery ashore they are perfectly harmless, and friendly vessels can pass over or strike them with impunity; but in war time, or at sight of an enemy's ship, the connexion is completed, and they become self-acting. This is effected by means of certain vibrating springs, as in the "circuit-closer," to which the wire is fastened. A blow causes these springs to meet, and so complete the circuit; and, though but for the thousandth part of a second, yet there would be a passage of electricity from the battery ashore and the mine would be exploded.

The Russian contact torpedo is fired by means of a fuze consisting of a vial of sulphuric acid, which the concussion of a ship striking the torpedo causes to break, and the acid is precipitated on to a mixture of chlorate of potass and common white sugar (in proportion of two parts of the former to one of the latter), which instantly produces flame. The fuze is placed in the torpedo with a portion of the vial protruding, and to prevent the entry of moisture there is a small cap of very thin copper, which does not prevent contact with the torpedo destroying the vial. Several of these are placed in each torpedo. The Russians have, it is said, very few "Whiteheads."

Proceedings of Societies.

ROYAL SOCIETY.

Nov. 15th.—Sir. J. Hooker, President in the chair.—The Bakerian Lecture, "On the Organization of the Fossil Plants of the Coal Measures,' Part IX., was delivered by Prof. W. C. Williamson.

GEOGRAPHICAL SOCIETY.

Nov. 12th.—Sir R. Alcock, President, in the chair.—The following gentlemen were elected Fellows: Rev. J. Mullins, D.D.; Messrs. J. Bolton, E. Easton, and J. Mullens. The subjects for the evening were the President's opening Address, and M. Broyon-Mirambo's 'Description of Unyamwesi, and the best Route thither from the East Coast of Africa.'

GEOLOGICAL SOCIETY.

Nov. 7th.—Prof. P. M. Duncan, President, in the chair.—Messrs. S. Clarke, W. Hunter, and the Rev. W. Roberts were elected Fellows. The following communications were read: 'Notes on Fossil Plants discovered in Grinnell Land by Capt. H. W. Fielden, Naturalist to the English North Polar Expedition,' by Prof. O. Heer, and 'On our present Knowledge of the Invertebrate Fauna of the Lower Carboniferous or Calciferous Sandstone Series of the Edinburgh Neighbourhood, especially of that division known as the Wardie Shales, and on the first appearance of certain Species in the Beds,' by Mr. R. Etheridge, jun.

QUEKETT MICROSCOPICAL.

Oct. 26th.—H. Lee, Esq., President, in the chair.—Seven new members were elected.—Dr. Edmonds gave a description of his new Immersion Paraboloid, and explained its use, and the advantages claimed for it as a means of effecting the dark ground illumination of objects under high magnifying powers, a solution of salts of lead in glycerene being specially recommended as the immersion fluid. The subject was illustrated by drawings of the apparatus, and by specimens of 'Amphipleura pellucida' and a Podura scale, exhibited by its means under microscopes in the room. It was pointed out that what had hitherto been regarded as markings on the Podura scale, appeared now to be featherlets or spines growing upon the upper surface. A discussion followed, in which Mr. Ingpen, Dr. Matthews, Mr. Powell, the President, and Dr. Edmunds took part. The proceedings terminated as usual by a Conversazione.

ASTRONOMICAL SOCIETY.

Nov. 9th.—W. Huggins, Esq., President, in the chair.—The following gentlemen were elected Fellows: Messrs. R. C. Carrington, A. Davidson, T. Gregory, Lieut. F. W. Jarrad, R.N., and Dr. A. K. Rollit. Lord Lindsay read a report from Mr. Gill of his observations of the opposition of Mars made in the Island of Ascension. After having erected his instrument, he found that the clouds which form nightly upon the Green Mountain were likely to hinder his observations, and he therefore resolved to shift his station to the other side of the island. This he did without delay, and has been rewarded by obtaining fifty-seven sets of observations, thirty-two sets made in the evening, and twenty-five sets in the morning, during which the distance of the planet has been measured from twenty-two different stars of comparison. Mr. Gill intends to remain some time longer in the island, in order to make observations of the opposition of the minor planet Melpomene. The Astronomer-Royal gave an account of the reductions of the telescopic observations made by the English parties who observed the Transit of Venus. The result which has been arrived at is, that the distance of the Sun's centre is 93,375,000 miles, a value somewhat larger than was expected; but considering that the result is derived from the observations of forty-two different observers, many of whom had undergone considerable training, the Astronomer-Royal was of opinion that the value of the Sun's distance which had been deduced was more trustworthy than any other value that had been previously obtained. Prof. Cayley remarked that this was probably the first occasion on which a determinant of an infinite number of rows and infinite number of columns had been made use of in a physical investigation. Mr. Green showed some beautifully finished drawings of the planet Mars, which he had made during the months of August and September of the present year, with a 13-inch reflector, in the Island of Madeira. Lord Lindsay also read a paper 'On a New Form of Spectroscopic Combination suitable for Observing the Bright Lines of Nebulæ.'

ZOOLOGICAL SOCIETY.

Nov. 6th.—A. Grote, Esq., V.P., in the chair.—The Secretary read a Report on the additions to the Menagerie during June, July, August, and September. Letters and papers were read: from Mr. R. Trimen, 'On the African Species of Sarcidiornis'; from Mr. A. O. Hume, on Mr. Howard Saunders' recent paper on the Sterninæ; by Prof. W. H. Flower, entitled, 'A further Contribution to the Knowledge of the Whales of the Genus Mesoplodon'; from Lieut.-Col. R. H. Beddome, on three new species of Reptiles from the Madras Presidency'; from the Marquis of Tweeddale, F.R.S., on a collection of Birds made by Mr. A. H. Everett in the island of Luzon, Philippines: three new species were named 'Megalurus ruficeps, Dicæum xanthopygium, and Oxycerca Everetti'; by Mr. D. G. Elliot on 'Felis tigrina,' Erx, and its synonomy, showing that 'F. mitis, F. Cuv., and F. macrura, Pr. Max.,' are identical with that species; by Prof. Garrod, on some points in the Visceral Anatomy of the Rhinoceros of the Sunderbunds (Rh. sondaicus), and on an anatomical peculiarity in certain Storks; by Mr. Edgar A. Smith, on some shells from Lake Nyassa and a few Marine Species from the mouth of the Macusi River, near Quilimane, on the East Coast of Africa; from Dr. O. Finsch, on a new species of Petrel from the Feejee Islands (Procellaria albigularis); and on the collections of Birds made during the voyage of the Challenger at Tongatabu, the Fiji Islands, Api, New Hebrides, and Tahiti; by Mr. E. R. Alston, 'A Supplementary Note on Rodents and Marsupials from Duke-of-York Island and New Ireland; from Mr. L. Taczanowski, containing a supplementary list of birds collected in North-western Peru by Messrs. Jelski and Stolzmann.

ENTOMOLOGICAL SOCIETY.

Nov. 7th.—Prof. Westwood, President, in the chair.—Mr. M'Lachlan exhibited a collection of Lepidoptera formed by Captain Feilden and Mr. Hart, during the recent Arctic Expedition, and some remarks were made upon Arctic insects by the Rev. A. Eaton. Mr. Meldola exhibited a gynandromorphic Pieris Brassicæ, caught in Oxfordshire, by Mr. J. Watson, and a five-winged specimen of Gonepteryx Rhamni, taken in Norfolk by Mr. J. Woodgate. Mr. H. Goss exhibited a gynandromorphic specimen of G. Rhamni, taken in Sussex. Mr. J. W. Douglas exhibited a specimen of Polyphylla Fullo, brought to this country by an Antwerp steamer; also specimens of Tettigometra impressopunctata and Typhlocyba debilis, taken on Sanderstead Downs. Mr. Boyd exhibited a larva of Pieris Rapæ, which was infested with Microgaster. Prof. Westwood read notes on Exotic Coleoptera, and exhibited drawings and specimens. Mr. Wood-Mason made remarks upon stidulating Crustaceans, and likewise announced the existence of stridulating apparatus in a species of Phasma. Mr. S. Saunders read a paper 'On the Hampstead Atypus,' and Mr. F. Enock exhibited the male and female of this spider. The following papers were read: 'Descriptions of new Species of the Coleopterous Genus Callirrhipis (Rhipidoceridæ) in the British Museum,' by Mr. C. O. Waterhouse; 'Descriptions of a new Genus and two new Species of Sphingidæ, with Remarks on the Family generally,' by Mr. A. G. Butler; 'Descriptions of Halticinæ,' by Mr. J. S. Baly; and 'Descriptions of new Species of Cleridæ, with Notes on the Genera and Corrections of Synonymy,' by the Rev. H. S. Gorham.

ANTHROPOLOGICAL INSTITUTE.

Nov. 13th.—Dr. J. Evans, President, in the chair.—The Rev. T. A. Bennett and Mr. F. V. Dickins were elected members. An interesting series of casts of skulls, made of papier-machc, were exhibited, and a special vote of thanks was ordered to be sent to Professor Bogdanow, of Moscow, by whom they were presented to the institute. Major-General A. Lane Fox exhibited some flint flakes from Egypt, and a note from Captain R. F. Burton was read on the same. The Director read a paper, by Mr. H. H. Howorth, "On the Spread of the Slaves, Part I. The Croats.'—This was followed by a paper "On the Castiliere d'Istria," by Captain R. F. Burton.—Mr. Hyde Clarke, the President, Major-General A. Lane Fox, and Mr. Moggridge took part in the discussion.

NUMISMATIC SOCIETY.

Nov. 15th.—J. Evans, Esq., D.C.L., President, in the chair.—The Right Hon. Lord Selborne, the Hon. R. Talbot, the Rev. H. R. Huckin, Mr. T. Hodgkin, and Mrs. Priestly were elected members.—Sir J. H. Lefroy exhibited a brass token for twopence, of the Somers Islands, of the Hog-money series. Mr. Evans exhibited six half-sovereigns of the later coinage of Edward the Sixth. Mr. R. A. Hoblyn exhibited a curious forgery of a crown of William the Third, 1697, and a farthing of George the First, bronzed, struck on a thin *flan* with a milled edge. Mr. E. H. Willett read a paper "On some Recent Additions to the Ancient British Coinage of the South-Eastern District," in which he gave an account of the discovery on the seashore near Bognor, at intervals during the last few years, of as many as 280 gold coins, comprising many unpublished types. About half the number are inscribed with the names of the sons of Commius—Tincommius, Verica, and Eppillus—the rest being without inscriptions, and all indigenous to the district extending from Hastings to the Avon in Hampshire, bounded longitudinally by the North Downs. Together with the coins were discovered a number of small pieces of gold, having the appearance of metal amassed for the purposes of an executive mint. In regard to the identity of the chief of the Atrebates, named Commius, who surrendered to M. Antony on condition "ne in conspectum veniat cujusquam Romani," with the Commius of the coins, Mr. Willett remarked that there was no direct testimony, although there were strong presumptive reasons for supposing them to be one and the same person, it being now placed beyond doubt that the sons of a king named Commius reigned in south-eastern Britain within a period of twenty years after Cæsar's first invasion. The legend CALLEV on one of the coins of Eppillus, and C A on several others, indicated, in Mr. Willett's opinion, the town of Calleva (Silchester) as the capital of the whole district. Prof. Church contributed minute analyses of the coins, and made some remarks on the nature of the alloys, and on the peculiarities of structure exhibited by the metal employed.

STATISTICAL SOCIETY.

Nov. 20th.—G. J. Shaw Lefevre, M.P., President in the chair.—A numerous list of candidates were elected Fellows of the Society.—The President delivered his Inaugural Address.—Dr. Mouat afterwards read his second and final report on the Ninth International Statistical Congress, held at Budapest in 1876.—A discussion on Dr. Mouat's report followed, which was sustained by Professor Leone Levi, Mr. Newmarch, Mr. Walford, and Dr. Farr.

SOCIETY OF ARTS.

Nov. 21.—Mr. W. Hawes in the chair.—This being the first meeting of the session, the usual opening Address was delivered by Mr. W. Hawes, deputy-chairman of the Council.

PHILOLOGICAL SOCIETY.

Nov. 16th.—Mr. A. J. Ellis in the chair.---Miss Coleman and Mr. D. Ferguson were lected members. The papers read were: On the Use of final 'n' in 'an,' 'mine,' &c. before a Vowel and 'h' in the Authorized Verson of the Bible," by Mr. B. Dawson. The examination of over a thousand instances showed extraordinary inconsistencies in the use of final 'n'. They were due, speaking generally, to the fact that the passages lifted from Tyndale's Bible retained the 'n' while the passages altered by the translators of 1611 rejected it. "On "curmudgeon," by Mr. W. W. Skeat The 'cur' was 'corn' as P. Holland's "cornmudgin," or cornhoarder, showed. The 'mudgin' was from 'mudge' or 'mug,' hoard or hide, seen in 'muglard,' a miser, and hugger-'mugger,' while the other form of the word 'much' (pron. 'mooch)' was seen in the Early English 'muchares,' skulking thieves, in "'miching' mallecho,' the old French 'mucer' or 'muchier'. "On the Compound Tenses of Romantic Reflexive Verbs," by Mr. H. Nicol, in reference to the Italian and French use of the intransitive auxiliary 'esse' with an oblique case of the reflexive pronoun. After pointing out the importance for investigating this development of distinguishing between those verbs of reflective form which have reflective meaning ('je me suis lavé'), and those which have intransitive meaning ('je m'en suis allé'), he noted that where an intransitive verb takes 'avoir' when used alone, and 'etre' when used with the reflexive pronoun, the difference cannot be explained, as Gessmaintains, by the intransitive nature of the reflective form. The meaning of the simple verb makes impossible for the Old French 'se dormir' to be more intransitive than 'dormir' itself, so that the fact that the perfect of the former is 'je me suis dormi' of the latter 'j'ai dormi', calls for some other explanation.

CHEMICAL SOCIETY.

Nov. 15.—Dr. Gladstone in the chair. The President announced that as Professor Odling was unable to attend, his paper 'On Gallium" would be postponed till the next meeting. The following communications were made: "First report to the Chemical Society on some points in Chemical Dynamics," by Dr. Wright and Mr. Luff. An elaborate series of experiments was made to find out the temperatures at which the actions of carbonic oxide, hydrogen, and free amorphous carbon on oxide of iron or oxide of copper are first perceptible. The authors find that this temperature varies with the physical coudition of the oxide used; that hydrogen acts on a given oxide at a lower temperature than carbon, and carbonic oxide at a lower temperature than hydrogen, and that a given reducing agent begins to act on copper oxide at a lower temperature than on iron oxide. "On the Chemistry of Cocoa Butter, Part I. The New Fatty Acids," by Mr. C. T. Kingzett. The first acid is a low acid of the series $C_nH_{2n}O_2$, having the formula $C_{12}H_{24}O_2$, *i.e.*, lauric acid, but it melts at 57·5deg.; the second acid is a high acid, having the formula $C_{64}H_{128}O_2$, crystallizing in micrascopic needles or granules, melts at 72·2deg., and at a high temperature distils apparently unchanged. The author proposes for it tne name of theobromic acid. It is pointed out that the usual statement in books "that cocoa butter yields almost exclusively stearic acid" is entirely incorrect. "On the Influence exerted by Time and Mass in certain Reactions in which Insoluble Salts are Produced," by Mr. M. M. P. Muir. The author has taken solutions containing known quantities of calcium chloride and potassium or sodium carbonate, mixed, allowed to stand for a certain number of minutes, and then estimated the quantity of calcium carbonate formed. He has arrived at the following conclusions: that the greater portion of the chemical change takes place during the first five minutes, the reaction then decreases in rapidity; the relative masses of the salts exert an important influence—thus, if the mass of alkaline carbonate be four times that required, the action is completed in five minutes, but if an equivalent quantity only be present, the action is not finished in forty-six hours. Potassium carbonate yields more calcium carbonaee in a given time than sodium carbonate. An increase of temperature increases, whilst dilution, especially with solutions of potassium or sodium chloride, diminishes, the rapidity of the action. Some experiments are given on the action of solutions of calcium sulphate and sodium chloride.

MICROSCOPICAL SOCIETY.

Nov. 7th.—H. C. Sorby, Esq., President, in the chair.—Mr. G. W. Vyse and Mr. W. H. Jones were elected Fellows. A paper was read by Mr. T. Palmer, 'On the Study of Evergreens by means of the Microspectroscope,' in which he described the results of his examination of solutions of the colouring matters, oils, &c., from the leaves in various stages of growth. The paper was illustrated by drawings, and by the exhibition under the microspectroscope of some of the solutions referred to. A paper, by Mr. F. A. Bedwell, 'On the Building Apparatus of Melicerta ringens,' was read by the Secretary. It minutely described the structure and functions of those organs, and was an important addition to the number of contributions to the history of this beautiful rotifer. The paper was illustrated by drawings, some of which were enlarged upon the blackboard by Mr. C. Stewart. A short discussion followed, in which Mr. Ingpen, Mr. Slack, and the President took part. A paper was taken as read, 'On the Lachrymal Gland of the Turtle,' by Mr. C. Stewart.

MATHEMATICAL SOCIETY.

Nov. 8th.—Lord Rayleigh, President, in the chair.—The following were elected Members of the Council for the session: President, Lord Rayleigh; Vice-Presidents, Prof. J. C. Maxwell, Mr. Merrifield, and Prof. H. J. Smith; Treasurer, Mr. S. Roberts; Hon. Secretaries, Mr. Jenkins and Mr. Tucker; Other Members, Prof. Cayly, Mr. Cotterill, Mr. J. W. L. Glaisher, Mr. Hart, Dr. Henrici, Dr. Hirst, Mr. Kempe, Dr. Spottiswoode, and Mr. J. J. Walker. The following communications were made: 'On the Calculus of Equivalent Statements,' by Mr. H. MacColl; 'Progressive Waves.' by Lord Rayleigh; 'Notes on the Triple Generation of Three-bar Curves, on the Mass-centre of an Octahedron, and on Vortex Motion,' by Prof. Clifford.

NEW SHAKSPERE SOCIETY.

Nov. 9th.—Mr. Tom Taylor, V.P., in the chair.—Two Members were elected. Mr. E. Rose read a paper "On Shakspere's Adaptation of 'King John.'" He contended that Shakspere's skill as a practical dramatist had never been really appreciated, and maintained that he owed his universal fame in great measure to this quality. To prove this thorough knowledge of his art, Mr. Rose compared the play of 'King John,' act by act and scene by scene, with the anonymous play from which it was adapted by Shakspere, and showed how he had put it into practicable stage-form, compressing scenes, expanding speeches, reducing the exits and entrances to a minimum, and making the important characters stand out in bolder relief. At the same time, Mr. Rose could not but feel the want of a strong central character in the play, which was fatal to its success on the stage, and which might, he thought, have been overcome had Shakspere departed boldly from the lines laid down by the original author, which, instead, he has followed with singular closeness. Messrs. Tom Taylor, Furnivall, P. Bayne, Hetherington, and others took part in the discussion.

THE INSTITUTION OF CIVIL ENGINEERS.

Subjects for Papers.—Session 1877—78.

The Council of the Institution of Civil Engineers invite communications, of a complete and comprehensive character, on any of the subjects included in the following list, as well as on other analogous questions. For approved original communications, the council will be prepared to award premiums, arising out of special funds bequeathed for the purpose, the particulars of which are as under:—1. The Telford Fund, left "in trust, the interest to be expended in annual premiums, under the direction of the Council." This bequest, with accumulations of dividends, now produces about £260 annually. 2. The Manby Donation, given "to form a fund for an annual premium or premiums for papers read at the meetings," of the value of £10 a year. 3. The Miller Fund, bequeathed by the testator "for the purpose of forming a fund for providing premiums or prizes for the students of the said institution, upon the principle of the 'Telford Fund.'" This fund, with accumulations of dividends, now realises nearly £180 per annum. Out of this fund the Council have established a scholarship, called "The Miller Scholarship of the Institution of Civil Engineers," and are prepared to award one such scholarship, not exceeding £40 in value, each year, and tenable for three years. 4. The Howard Bequest, directed by the testator to be applied for the purpose of presenting periodically a prize or medal to the author of a treatise on any of the uses or properties of iron, or to the inventor of some new and valuable process relating thereto, such author or inventor being a member, graduate, or associate of the said Institution. The annual income amounts to rather more than £16. It is proposed to award this prize every five years, commencing in 1877. The Council will not, in any case, make an award unless a communication of adequate merit is received; but, on the other hand, more than one premium will be given, if there are several deserving memoirs on the same subject. In the adjudication of the premiums no distinction will be made between essays received from a member, an associate, or a student of the institution (except in the cases of the Miller and Howard bequests, which are limited by the donors), or from any other person, whether a native or a foreigner.

List.

1. The Triangulation Survey, and Mapping of Countries and Districts, including the Astronomical Observations required for latitude and longitude, and the measurement of bases; with a description of the instruments employed, the reduction of the observations, and degree of accuracy of the results. 2. The Levelling of Countries, either by Spirit-levelling, vertical angles, barometers, or the boiling-point of water; with a description of the instruments employed, the reduction of the observations, and degree of accuracy of the results. 3. The Manufacture of Cements, comparing the processes followed in different countries.

4. The Manufacture of Bricks by Machinery, including descriptions of special kilns, &c 5. The effect of the lapse of time on the Strength of Materials strained beyond the supposed limit of elasticity, but within the ultimate strength. 6. The Causes of Slips in Rocks and Earths of different kinds, and the Conditions that induce treacherous ground in Railway-cuttings, tunnels, and the sides of valleys near reservoir banks. 7. The Application of Steam Machinery for Excavating, and the Cost as compared with Hand Labour. 8. The Results of the Use of Steel in Mechanism and in works of Construction. 9. The Construction of Warehouses and of other buildings to resist Fire, and the relative merits of stone, brick, iron, and timber for that object. 10. The Warming and Ventilation of large Buildings. 11. The different systems of Road-making best adapted for large Towns, or where the traffic is heavy, including a Comparison of First Cost, Maintenance, and Durability. 12. The Design and Construction of Masonry Dams of great height for retaining water in Reservoirs. 13. The Storage and Filtration of Water, both natural and artificial. 14. The benefits and expedients of Irrigation in India and in other warm climates, and the proper construction of Irrigating Canals, so as to avoid erosion or silting, and to prevent the growth of weeds. 15. The Constant Service of Water Supply, with special reference to its introduction into the Metropolis, in substitution for the Intermittent System. 16. The systems of Domestic Water Supply suitable for rainless districts. 17. The different systems of Opening Bridges, with details of the modes of working them. 18. The Design, generally, of Iron Bridges of very large span, for Railway traffic. 19. The Design and Construction of Dock Gates and Caissons, including the requisite external and internal arrangements, illustrated by recent practical examples. 20. The Design and Construction of Building-slips for large Vessels. 21. The Appliances and Methods used in different countries for Tunnel-driving, Rock-boring, and Blasting, with details of the cost and of the results attained. 22. The Works carried out for the Improvement of the Seine and other French rivers, and of Inland Navigation generally. 23. The relative Value of Upland and of Tidal Waters in maintaining rivers, estuaries and harbours. 24. The Construction of Tide Gauges, and the usual method of carrying out a systematic series of Tidal Observations. 25. The differences in design of British and Foreign Locomotive Engines; showing the benefits derived from increase in weight, and the relation that ought to exist between the diameter of the wheel and the load it has to carry. 26. The Lighting of Railway Carriages. 27. The Construction of Steam Boilers adapted for very High Pressures. 28. The best practical Use of Steam in Steam Engines, and the effects of the various modes of producing Condensation, and of various grades of expansion. 29. The Modern Construction of Marine Engines, having reference to Economy, by Superheating, Surface Condensation, High Pressure, great Expansion, &c. 30. Modern Experience in Screw Propulsion comprising the comparative efficiency of propellers of large diameter, and of smaller ones deeply immersed, and the influence of form. 31. The best shapes for Yachts and for Ships for commercial purposes. 32. The relative efficiency of the Screw propeller and paddle wheels for Towing purposes. 33. A Comparison of the different Modes of transmitting power for auxiliary purposes on board Ships, and in Shipyards, and Engine Factories. 34. The various descriptions of Pumps employed for Raising Water or Sewage, and their relative efficiency. 35. The relative advantages of Wind and Water as Motive Powers, compared with Steam Power, and the Motors most suitable for utilising them. 36. Compressed Air as a Motive Power, particularly as applied to Machinery in Mines and to Locomotives in Tunnels, with some account of its application on the Continent. 37. The Manufacture of Mineral Oils, and the Lamps best adapted for their consumption in dwellings and lighthouses. 38. The "Output" of Coal in the United Kingdom, as compared with that of other countries, illustrated by statistics, showing where Coal is produced, where and how it is consumed, and the relative quantities exported. 39. The Methods and Machinery employed in sinking and in working deep Coal Mines. 40. Coal Depots for Ocean Steamers, the various points involved in their management, and the methods of preserving large quantities of coal from deterioration. 41. The Metalliferous or other Mining Districts in different countries, and the mode adopted in working them. 42. The Methods employed in securing the Excavations in mining large and irregular shaped mineral deposits, for example, the Almaden Mines, the Great Comstock Lode, &c. 43. The appliances used in different countries for Dressing the Ores of Lead, Copper, Zinc, and Tin, and the Smelting of such Ores, with details of the results and cost by various methods. 44. The losses in the Reduction of Metallic Ores by different methods, distinguishing losses in dressing from those in smelting. 45. The disposal and utilisation of Slags from various smelting processes. 46. The Management of Underground Waters in mining districts, and the relative economy of distributed or trunk pumping engines, adits, &c., in particular cases. 47. The Appliances and Processes for the manufacture of Artificial Fuel in different counties. 48. On recent Progress in Telegraphy, with a notice of the theoretical and practical data on which that progress has been based. 49. Electricity as applied to Lighting purposes. 50. On Torpedoes, and their influence on Naval Construction.

INSTRUCTIONS FOR PREPARING COMMUNICATIONS.

The Communications should be written in the impersonal pronoun, and be legibly transcribed on foolscap paper, on the one side only, leaving a sufficient margin on the left side, in order that the sheets may be bound. Every Paper must be prefaced by a concise Abstract.

All Communications should be accompanied with a set of drawings on tracing paper, to as small a scale as is consistent with distinctness, and ready to be engraved. If accepted for reading then there will be required a series of diagrams (which will be returned) sufficiently large and boldly coloured, so as to be clearly visible when suspended in the Theatre of the Institution.

Papers which have been read at the Meetings of other Societies, or have been published in any form, cannot be read at a Meeting of the Institution, nor be admitted to competition for the Premiums.

The Communications must be forwarded to the house of the Institution, where any further information may be obtained.

CHARLES MANBY, Hon. Sec.
JAMES FORREST, Sec.
The Institution of Civil Engineers,
25, Great George-street, Westminster.
London, S.W. October, 1877.

PROPOSED SHAKESPEARE MEMORIAL AT STRATFORD-ON-AVON.

THE desire to erect some monumental memorial to Shakespeare in his native town, has for very many years been cherished, not only by the people of Stratford, but by very many throughout the Kingdom, and at various times efforts have been made to give a practical effect to such desire.

About two years ago Mr. C. E. Flower put forth a scheme, which at once commended itself to those in whose minds the desire had grown into a duty. This scheme embraced the erection of a theatre, a library, and a picture gallery:—a small theatre, where, at least once a year on the anniversary of his birth and death, April 23rd, one or more of the inimitable plays of this great man could be put in a fitting manner upon the stage:—a library, chiefly, though not exclusively, devoted to the literature of the drama, and of those subjects allied to it:—a picture gallery, on the walls of which could be hung works of art inspired by, and illustrative of the writings of him, who as a word-printer has never been excelled. Mr. Flower gave a site, and a money contribution of £1,000, which was soon increased to over £3,000 by the contributions of Stratford people.

So much interest was manifested in this undertaking, backed by substantial aid from all parts of the country, that eventually an Association, called the Shakespeare Memorial Association was formed, and was soon after able to commence the building of the first portion—the theatre—the foundation stone of which was laid with full Masonic ceremony on the 23rd of April last, by Lord Leigh, Lord Lieutenant of the County.

All the money for this portion of the memorial, amounting to upwards of £10,000, has been subscribed and guaranteed, and the works are progressing satisfactorily.

It is felt, however, that the memorial will be most incomplete without the library and picture gallery, and that if these portions can be proceeded with at the same time as the first portion, a very considerable saving will be effected.

To do this, a further sum of £8,000 is required.

Mr. C. E. Flower, has again come to the front, and made us the liberal offer of £4,000, on condition that a like sum be raised by the end of the year.

At the Mayor's annual banquet, on the 18th instant, Mr. Henry Graves, the eminent art publisher, of Pall Mall, announced that he had, by will, bequeathed all his pictures of a Shakesperian character to this gallery.

Two such noble gifts (conditional as they are) lay upon the people of Stratford in particular the heavy responsibility of raising this sum, so as to secure for the town locally, and the nation generally, the completion of this truly national memorial to the world's greatest poet. The Mayor was requested to call a public meeting of the inhabitants of Stratford, which took place on the 22nd instant; and at this meeting a resolution was passed calling upon the corporation "to take steps to bring the subject before the nation, and especially before the corporations of the various cities and towns of the United Kingdom, in order to secure their aid in this national undertaking." It is in compliance with this resolution, and with a full sense of the duty and responsibility which devolves upon them, that the ancient corporation of Stratford-upon-Avon now issues this address, appeals to the sympathy of the entire nation, and confidently solicits liberal subscriptions from all classes to enable the public to avail themselves of the gifts of Mr. Flower and Mr. Graves, and to present to the world a complete memorial, raised in honour of one, who has bequeathed to his country the richest legacy.

JOHN JAMES NASON, M.B., Mayor.
THOMAS HUNT, Clerk.
Town Hall, Stratford-upon-Avon,
October, 1877.

KELWAY'S PATENT ELECTRIC LOG.

THIS invention is applicable to navigation, nautical surveying, and speed trials; also as a range-finder for naval gunnery.

It is essentially a mode of conveying inboard to any part of a vessel a record of the work done by a log in the water. This is accomplished by causing the log to complete an electric circuit within a water-tight compartment. The electric current passes through a cable to an indicating apparatus placed on board. In the present case the indications are given every one-eighth of a knot. Each graduation of which there are eighty, on a large dial represents that distance—the small dial within the other recording up to 100 knots.

Some advantages claimed for this invention are that it provides for the registration on board at regular intervals of the work done by the ordinary Patent Log in the water, without the necessity of hauling it in.

The distance run is shown upon a dial, which may be placed in the captain's cabin, the chart room, or any other desired part of the vessel.

It indicates at once any mishap to the log, by fouling or carrying away.

It saves the labour, loss of time, and error of registration involved in hauling in the log, which can remain in the water, unless fouled, until entering port.

The instantaneous registration of the distance run between two bearings enables navigators to calculate with accuracy their position in reference to a light, headland, or other fixed object.

The indicator can be re-set on board at any moment.

The addition of a small self-contained apparatus and a bell, which can be placed with the indicator or in any other part of the vessel, communicates by sound the regular working of the log, and enables the officer on watch to detect any irregularity and to take instantaneous bearings at given distances, without referring to the indicator or the log.

The apparatus is compact and self-contained, and the electric battery is of the simplest character, not liable to derangement, and requiring no attention whatever. Cells of the kind supplied with the instrument have been in use without attention for two years, and they can be replaced, if desired, without difficulty, at a trifling cost.

The improvement does not in the slightest degree interfere with the working of the ordinary patent log to which it is attached.

FOREIGN SCIENCE.

Mons. Armand Bilton has just invented a new electric light regulator capable of acting in every position, and of a very simple construction. The apparatus is composed of an articulated parallelogram, like that of the regulator by centrifugal force of, Walt. The movements are produced without the assistance of any wheels. It allows the maintenance of the luminous part at a fixed point, with direct or alternative currents. Another savant thus writes in the last number of *Les Mondes*, "I was led by a crowd of experiences to admit that water is nothing else than hydrogen with electricity, or oxygen minus electricity, or in other terms, that normal hydrogen electrized makes water; and that normal oxygen diselectrized also makes water, or again, that hydrogen, oxygen, and water are the same thing, with a different degree of electrization." Such is a French scientific way of telling us what water is. An exhibition of German coal was opened at Hamburg at the beginning of last month. The report of the Academy of Sciences of Vienna, mentions that Dr. Schnopfragen has been the first to make use of solntion of gold in investigating the structure of the brain.

In regard to the science of meteorology, here is a new important project. Lieut. Weyprecht and Count de Wilczek have announced to the Meteorological Society of Utrecht that they are undertaking a year's expedition to establish a station at Nova Zembla. At the same time similar stations are to be erected at other points, which are in the most elevated degree of latitude, and most accessible. There will be a last one at Finmark, north of Norway; then at the southern pole there will be one at Cape Horn, or Kerguelen, or Auckland Isles. By virtue of observations received from these different stations at opposite poles it is expected to obtain the clearing up of certain hitherto unexplained phenomena relative to terrestial magnetism or the aurora borealis. M. Gaston Planté has produced a rheostatic machine. Speaking whereof he puts it, "There is thus realised the translation of dynamic electricity by other means than induction properly so-called with the aid of an effect simply of static influence ceaselessly renewed. so that this apparatus may be designated machine rhéostatique. Boat and small steamer building for the Lake Alster, &c., at Hamburg is a staple. They are open there to improve boats and steamers for quiet water, pleasure boats and outriggers.

Returning to the subject of science and manufacture in Brazils and South America started in our last from the last British Consular reports which the librarian at the Foreign Office enabled us to see, we find the Consul of Rio lamenting the want of a number of factories of all sorts because the country is really so vast, rich, and capable. Particularly in regard to cotton this applies. There is one very fine cotton factory at Petropolis, a model in its way; but this is only a little matter. There are also a few good metal manufactories. Coach building is extensively and well-carried on at Rio. Some of the machinery on the sugar plantations is antiquated, though there are a few good sugar refineries. The present Emperor has the credit of being enlightened, and we believe the government may be inclined to take the English practical view of their material. The English North Argentine Railway has some famous workshops at Sola.

INDUSTRY AND ART IN LONDON.

"Student's Organ."—This is to some extent in itself a new idea. The instrument manufactured by Messrs. Brown and Son, Kennington, is a smallish model of the large upright organ so much used in churches. It is, however, 7 feet high by 4 feet broad, and 2 feet from front to back, and may be taken into two parts, and set up again by a young student. Some of the particulars are 1 and 2 manuals open diapason—from tenor F, and stop diapason bass, enclosed in a general swell; from C C to G there is only one stop, but it is contemplated to build some instruments with two. The lower part contains all the pedals; the foot-board can be raised, and slides into the instrument. The upper contains the pipes, swell-box, and on looking therein we find that there is a new method of covering, viz., by metal slides. As the large organ is rather a difficult, but at the same time very magnificent instrument, it is an advantage that students should be able to obtain a model of this kind to inaugurate their studies. The first Student's Organ manufactured has already been sold. It is also an advantage, considering the high price of grand organs, that this one, may be obtained at a comparatively low cost. The instrument of plain wood varnished looks well by day or gas-light. The keyboard is, of course small, about two feet in length, and, as we have said, there is only one stop.

"New Copying Apparatus."--This is the invention of Messrs. Stevens and Richardson, printers and stationers, Great Queen-street. It resembles a flat pretty thick writing case, and is in different sizes; for example, large sheet and note. It is closed by a pin in the edges, and has a small roller like a miniature garden one, in a loop, and in one of the exterior sides. It displays when open a book of copying paper and some oilskins; also pockets for holding letter-paper. The sheet is damped in the usual way, and when the letter is placed, with the paper over it is rolled backwards and forwards firmly. This firm says that copying presses are unnecessary; of course the work used must be good and strong. The apparatus is certainly simple enough, and will save a good deal of time and obviate the difficulty of carrying a copying press about. The firm supplies packages of thin paper to replace the sheets on the case.

"Rubens' Cabinet."—Perhaps many of the public are not aware that in a saloon in New Bond-street, has been exhibited for the last two or three months a cabinet which belonged to the famous Rubens. It was presented to him on return from an embassy, presumably the one to Spain, by his pupils who executed the paintings on the panels which he finished off himself. On throwing open the doors some fifteen panels are visible, and the eye is immediately gratified by the enamelled looking paintings, with very rich colour. The subjects are the Judgment of Paris, a female figure, typical of the arts and sciences, and on the drawers beautiful cupids or infants cutting corn, squeezing grapes, &c. We cannot but dwell on the deep perfection of the corn and other objects upon which the infants are engaged. The centre panel is enclosed as a pillared monumental door. This cabinet was lately acquired in Paris by Mr. Donaldson, from a descendant of the painter. The material consists of black ebony, and the height is 5 ft. to 6 ft.; breath about 5 ft. This is of course a somewhat costly piece of art, and deserves attention from great collectors and trustees of museums. As the minute portions and colouring are so beautiful, and the preservation is wonderful, we hope it may be secured for London, or at any rate for Great Britain.

BRITISH AND FOREIGN JOURNAL OF COMMERCE, TRADE MARKS, AND INTERNATIONAL EXHIBITIONS.

A change will be observed in the title of this journal. The paper has hitherto been known as "Trade Marks," but its style is now altered to a title more in accordance with the variety of the subjects with which for some time past it has been identified. The subject of International Exhibitions is closely linked with that of International Protection of Trade Marks, and, ever since the publication in the second number of the list of awards at the South African International Exhibition, information has been given in connection with exhibitions which was valuable in itself and not readily accessible elsewhere.

WATER SUPPLY FOR DOMESTIC USE IN TOWNS AND VILLAGES, AND FOR MANUFACTURING AND AGRICULTURAL PURPOSES, OBTAINABLE FROM PRIVATE ESTATES.

Mr. Bailey Denton, who is a well knewn authority on agricultural drainage, &c., calls the attention of landowners to the provisions of the "Limited Owners' Reservoirs and Water Supply Further Facilities Act, 1877," which obtained the royal assent on the 2nd of August last (1877), and which enables landowners of limited interests to charge their estates with the costs of works construeted thereon for the supply of water to farms, manufactories, villages, or towns, whether within or without those estates.

This Act may be brought into operation profitably to those who having the command of springs, streams, surface water, or subterranean water, may provide, collect, or raise and store a supply upon their properties, and very beneficially to those persons in the locality who are in want of a sufficiency of water and willing to pay for it.

The preamble of the Act recites that whereas powers had been previously given to landowners of limited interests to charge their estates with sums expended in the construction of water works for agricultural purposes when they effect a permanent yearly increase in the value of such estates exceeding the yearly amount it was sought to charge upon it, it would in many parts "greatly conduce to the affording of a plentiful supply of pure water to the inhabitants of villages and towns, and to the industrial requirements of the locality, if facilities were given to landowners to charge their estates with the cost of the works for the supply of water for other than agricultural purposes."

THE TELEPHONE.

In our recent notice of the telephone which was quoted from the able article of the "Times," we omitted to state that the practical realization of Mr. Cromwell Varley's telephone which was exhibited to the public at the Queen's Theatre is due to the enterprising and untiring energy of his brother, Frederick Henry Varley, who constructed the first telephone in 1870, for his brother, and who in a short period of four week's exertion, brought the apparatus for the Queen's Theatre to its present perfection. It may perhaps seem that as the India-Rubber Company, of Silvetown, erected the wires, that they also constructed the telephone. Instead of that being the case the apparatus employed was made by the firm of O. and Fred. Varley, of Mildmay Park Works, under Mr. Frederick Varley's immediate supervision. The Silvertown works only erected the wires between the Queen's Theatre and Canterbury Hall. It was not found practicable to use the Post Office wires for the purpose.

RULES FOR CALCULATING THE SPEED OF PULLEYS.

The diameter of the driver being given, to find its number of revolutions:

Rule—Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions of the driven.

Ex.—24 inches diameter of driver×150, number of revolutions,=3,600 ÷ 12 inches diameter of driven=300.

The diameter and revolutions of the driver being given, to find the diameter of the driven, that shall make any given number of revolutions in the same time:

Rule—Multiply the diameter of the driver by its number of revolutions, and divide the product by the number of required revolutions of the driven; the quotient will be its diameter.

Ex.—Diameter of driver (as before) 24 inches×revolutions 150=3,600. Number of revolutions of driven required=300. Then 3,600 ÷ 300=12 inches.

The rules following are but changes of the same, and will be readily understood from the foregoing examples.

To ascertain the size of the driver:

Rule—Multiply the diameter of the driven by the number of revolutions yon wish to make, and divide the product by the required revolutions of the driver; the quotient will be the size of the driver.

To ascertain the size of pulleys for given speed:

Rule—Multiply all the diameters of the drivers together and all the diameters of the driven together; divide the drivers by tho driven; the answer multiply by the known revolutions of main shaft.—*Scientific American.*

YELLOW LIGHT.

Dr. Robert Charles Croft calls attention to the peculiar effects of light when transmitted through a yellow medium—not only in disease, but also in other conditions of everyday life. Amongst the latter, Dr. Croft states that, from experiments lately tried, it is found that those who wear spectacles may derive the greatest comfort from the occasional use of a yellow medium—particularly when writing or reading at night, or in the bright light of day. An attempt was made at first to stain and grind the ordinary double convex and concave lenses, but it was found that the light thus transmitted was uneven, and so, by a very simple contrivance, spectacles can now be constructed by means of which—whenever the eyes begin to ache—immediate relief and great comfort can be obtained. When the known principles of coloured light are taken into consideration, it seems evident that the indiscriminate use of the ordinary blue spectacles must be wrong and contrary to scientific laws; and whilst in some cases blue light would be useful, in others it would be positively injurious. Those who understand photography know that when light passes through a yellow medium it is deprived of all its chemical properties, and that when it goes through a blue medium its chemical or actinic powers are increased. Therefore it would seem to be conclusive that the proper colour for soothing and comforting distressed or irritable eyes must be yellow. At any rate, those who have tried these yellow spectacles assert that the comfort derived therefrom is very great. Dr. Croft also says that the effect of this light will probably be greatly useful as an aid in medical treatment; and that when more evidence has been collected some striking cases will be published in the medical journals.

INVENTORS' INSTITUTE.

For promoting and protecting the interests of the less wealthy class of inventors intending to offer evidence of their ingenuity at the International Exhibition of 1862, the late Mr. Marsden Latham, M.A., Barrister-at-Law, conceived the happy idea of inaugurating an institute which should bring together the previously divided and not very satisfied class—inventors—in such a manner that all should be led to comprehend that they had many interests in common, and that it was to their mutual advantage to act in concert. In a very short time the list of members, under the presidency of Sir David Brewster, included a large proportion of the leading inventors of the country, Bessemer, Siemens, Varley, and others of equal repute, occupying positions on the council. Sir David Brewster, and several other warm supporters of the Institute, have passed away, and others have grown too old to take the same active part in the business of the society as formerly, but in the secretaryship the original founder has been succeeded by his colleague, Mr. F. W. Campin, Barrister-at-Law, who is equally well acquainted with the requirements of the members, and thus the Inventors' Institute retains vitality, and inaugurated its sixteenth annual session at the rooms of the Royal Society of Literature, Charing Cross, under the presidency of Sir Antonio Brady, J.P., F.G.S., who has ever been recognised as a warm advocate of inventors' rights, and who, during the time he has occupied his present position, has given great satisfaction to the members from the energy he has displayed in connection with every movement on their behalf, and on behalf of inventors in general. It is but reasonable to anticipate that in view of the forthcoming International Exhibition at Paris the numerical strength of the Institute will largely increase, as it is not unnaturally suggested that whatever may be the advantage of membership in connection with international exhibitions in England, it must be far greater in connection with those in countries the language and customs of which are different.—*Mining Journal.*

MECHANICAL FANS.

General M. M. Franzoni, of Naples, writes to us in French with reference to certain improvements in ventilation or purification of the air, which so far as the brief description he gives, enables us to judge, appears to consist in the use of mechanical fans.

DYING.

Shall I meet those haunting eyes
Under unknown skies,
And upon the sea-less strand
Clasp thy hand?

Have they dreamt the dreams which rose
On my soul one night,
When 'midst Eden's deep repose
I knew their light?

Oh! do those eyes, that weep
That I shall be no more,
Seek mine in spirit sleep
On that blest shore?

Perhaps 'tis thine angel love,
Whose semblance here thou art,
Whose eyes shine all above
To claim for Heaven my heart.

It may be that in dreams
Thou art most dear,
Tho' earth celestial seems
When thou art near!

V. Gonville D.

RECENT AMERICAN AND FOREIGN PATENTS.

Improved Piston Packing.—J. H. Ferdinand Otto, Reedsville, Wis. This invention relates to improvements in metallic piston packing, by which the packing rings are readily adjusted to the required degree of tightness by a simple mechanism The inner and outer split packing rings of the piston are guided between the end plates and expanded by three or more interior band springs. These springs are operated upon by sliding nuts that are moved forward or back by means of radial screws, which are operated by a worm gear. The shafts of the intermeshing pinions pass parallel to the piston rod into inner sockets of the face plate, which is attached by screw bolts to the body of the piston. The sliding nut is guided between lugs on the inside faces of piston head and follower. The socket openings of the face plate are closed by short cap screws, which admit, when removed, the engaging of the key with the nicked ends of the pinion shaft, so as to turn the same and sets the springs and rings to the required degree of expansion.

Improved Railway Switch Signals.—George W. Anders, Woodsboro, Md. The object of this invention is to provide an improved signal to indicate the position of the movable rails of a switch in the night time for the purposo of informing the engineer of an approaching train that the switch is open or closed, as the case may be. The invention consists in attaching to the switch lever a lantern having differently coloured glass panes, and provided with a swing lamp whose position in front of one or another of the coloured panes indicates the position of the lever, and thereby the position of the switch rails also. The invention further consists in the particular construction of the lantern and swinging lamp.

Improved Stove.—Moses Jones, Hymer, Kan. The firebox or inner shell is made of cast iron, and is provided with a top that extends to the outer shell. The outer shell is of sheet iron, and is higher than the firebox, and to it a cast iron top is secured. Between the top and the top of the firebox there is a flue, and below the top and around the sides of the firebox there is another flue. Slits are made in the back of the firebox, through which the products of combustion pass from the fire box to the flue. By opening the damper the smoke is permitted to escape directly to the chimney; and when it is closed the products of combustion pass through slits and a flue around the sides of the firebox to the front of the stove, where they pass upward through opening to the flue, and thence to the smokepipe. The arrangement not only utilises the greatest possible amount of heat, but it also prevents the stovepipe from becoming dangerously heated.

Improved Tinning Apparatus.—John B. Jones, Brooklyn, N. Y. In the operation of tinning five vessels or compartments are used. In this improved apparatus vessel the partition between two vessels is taken away, so that these become one vessel, and a shallow surface compartment is secured in the upper part of the vessel, the lower edge of which extends down a little into the melted tin, so as to confine the flux contained in it and prevent it from entering other vessels and injuring the flux in said vessel. With this construction the goods are pushed along in the vessel without being raised out of the melted tin, and thus the necessity of dipping the flux back and forth is avoided.

Skate Holder.—Ewen C. Henderson, Picton, Nova Scotia, assignor to himself and Henry Fraser, of same place. In using this device the toe of the skate runner is inserted between the lower parts of plates, and is then pushed upwards between two springs. As the springs reach an opening in the runners their ends springs through it, so that the skates may hang upon the orossed upper parts of said springs. The skates are detached by pushing them upwards and out at the upper end of the holder. When the skates are detached the holder may be readily carried in the pocket.

Galvanic Battery.—Charles A. Hussey, New York city. This invention is intended to produce a single fluid battery of constany strength for running electromotors fer light machinery, and all other purposes in whict a constant current is required. The batterh dispenses with the use of double-fluid batteries for these purposes, and consequently with the use of porous cups and other objectionable features of the same, while it is claimed, providing a cheaper and more constant current than a two-fluid battery. The elements are made in the shape of disks or otherwise, and mounted upon the shaft and revolved therewith. As only a part of the plates at the time is immersed into the fluid, which part almost instantly emerges again from the same by the same rotating motion imparted, and, as the hydrogen gas collected thereon is lighter than the atmospheric air, the surface covering of hydrogen is continually dissipated during the revolution of the plates in the air, and the plates kept free from polarization. Thus a current of strength is obtained, and a battery provided that may be used with equal efficacy at any moment.

Fire Escape.—Joseph Davenport, Massillon, O.—Upon a platform four T-shaped guides are secured, which are placed at right angles to each other, and upon each of which a slide is arranged. Four sets of bars are jointed togetherto form lazy-tongs, and are secured together at their outer joints by curved pieces. The bars of each series thus unite diminish in length towards the top of the series, so that all, when united, form a structure of pyramidal shape. Levers are pivoted in standards attached to the platform, and extend outward under the central joint of the lower bars and inward under a plate. Pulleys are journaled between ears projecting from the nnder surface of the plate. Ropes are attached to the slides and run over the pulleys and downward to a windlass under the platform, to which windlsss they are attached. The windlass has upon it a spnr wheel that is driven by a pinion on a shaft, which is journaled to the truck frame, and is provided with cranks. At the top a basket is suspended by cords. By turning the windlass the rope is drawn over the pulley and the slides are drawn toward the centre of platform, and at the same time the plate is drawn downward, carrying with it the inner ends of the levers, the outsr ends raising and carrying with them the lower pairs of jointed bars, causing the four series of bars to move upward, carrying with them a basket.

Adjustable Harrow, Ground Marker, and Corn Cultivator.—George E. Cooke, Rossville, Kan.—The object of this invention is to furnish an improved machine, which shall be so constructed that it may be used as an ordinary haarow for preparing the soil, for marking the ground for planting, and for cultivating small plants, and which may be adjusted to any desired width, and may be readily raised from the ground to clear it of rubbish, and for passing from place to place. To the upright part of the, near its lower end, is attached a coupling, to which the double trec is attached, several holes being formed in the said upright part to receive the bolt that secures the coupling to it, so that the point of draft attachment may be adjusted higher or lower, as may be desired. Several holes are formed in the bar to receive the pin, so that the crosshead can be moved readily moved forward or back to adjust the harrow wider or narrower, as may be desired. By operating a lever the harrow may be raised and lowered and adjusted to work at any desired depth in the ground.

Gate.—Irvin Yorst, Thornville, O.—This invention relates to an improvement in that class of farm gates which are pivoted in such a manner as to swing in a vertical plane, and thus avoid obstruction by snow and ice, and also admit of easy operation by means of levers extending either way from the gate, at right angles thereto. The invention particularly relates to the construction and arrangement of the devices for latching and unlatching the gate, and also counterbalancing operating the same.

Meal Bin.—John C. Durbin, Columbus Junction, Iowa.—The object of this invention is to furnish for kitchen use an improved flour chest for storing the flour, sifting the same, and providing receptacles for the different articles, the same having a hinged moulding board and space for all the parts required for making bread, pastry, &c., in one convenient piece of furniture.

Seed Planter.—W. S. Barton, Orangeburg. S.C.—This invention consists in the combination of the valve, provided with the double cam, the prongs of unequal length, the pivoted lever, and the open keeper with the wheel and with the rounds of the handle. The beams are made short and the rear ends are attached to the handles, between which is pivoted the dropping wheel. This wheel is made in the form of two cup-shaped disks, which are placed with their concaved sides toward each other, and are connected together by bolts passing through them near their edges. In the adjacent edges of the disks of the wheel are formed holes, which are closed upon the outer sides by valves rigidly attached to double cams, which are pivoted to the wheel. A lever is pivoted to a crossbar attached to the lower part of the handles, and to the lower end of which are attached two prongs. The prongs are made of different lengths, and are so arranged that an end of the longer one will strike the cam and open the valve just as it begins to rise from the ground. As the seed drops to the ground the shorter prong strikes the cam and closes the valve. The upper end of the lever passes through an open keeper attached to the upper crossbar of the handles, so that the lever can be turned to one side to move the prongs into such a position that they will not strike the cam, thus enabling the machine to be drawn from place to place without dropping seed.

Weed-folding Attachment for Ploughs.—Thomas M. Harbert, Burlington, Kan. This invention consists in a folder formed into bends, curves, and inclines, to adopt it to be attached to a plough beam for dividing, guiding, and folding down grass into the furrow. Upon the forward part of the plough beam a cast iron collar is secured, the lower part of which is formed into flanges for the folder to rest in. Upon the landside of the plough beam the fender is bent outward, and then downward to divide the grass, and extends back with a downward inclination nearly to the point of the plough.

Kitchen Cabinet.—George P. Ziegler, York, Pa.—This article of furniture is designed to embody in compact from various kitchen utensils and storage compartments, sink bench, table, kneading trough and and board, ironing board, meal and spice drawers, knife and rolling pin boxes, flour chest, etc. The novel feature consists in combining with the hinged cover, a hinged leaf having strips upon one side to form a sink bonch and a plain surface upon the other, which plain surface of leaf co-operates with a second leaf, hinged to the opposite side of the cover, to form a table.

Stand for Smoothing Fabrics.—John F. Frese, Baltimore, Md.—This consists in an adjustable frame or smoothing board, which is pivoted to standards and constructed with a metallic surface, on which the moist and starched fabrics are smoothed and dried. It will be found, on removing them, that they are smooted and glossed as though they were ironed.

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